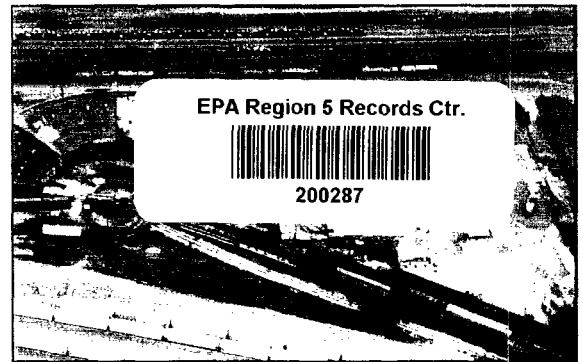
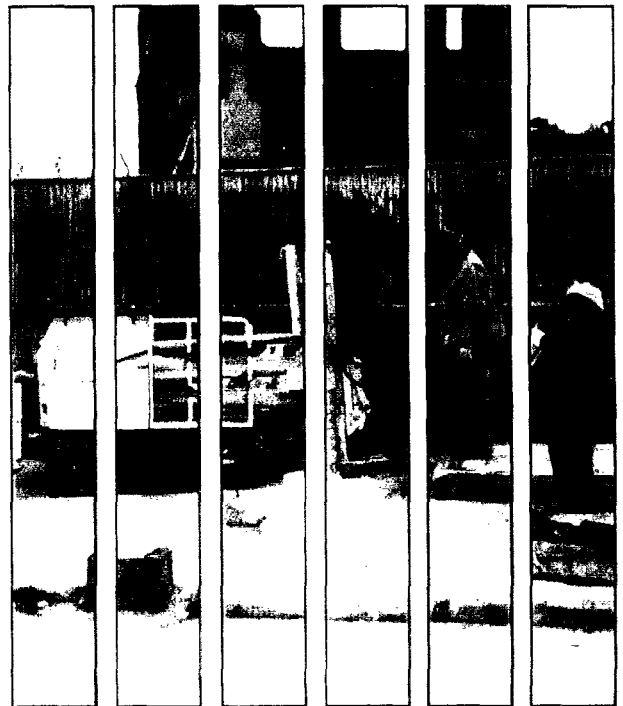


Engineering Evaluation and Cost Analysis (EE/CA) Data Report



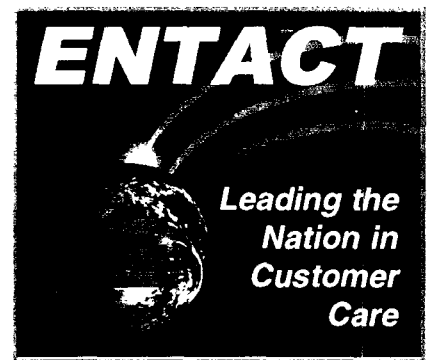
for the Master Metals, Inc. Site



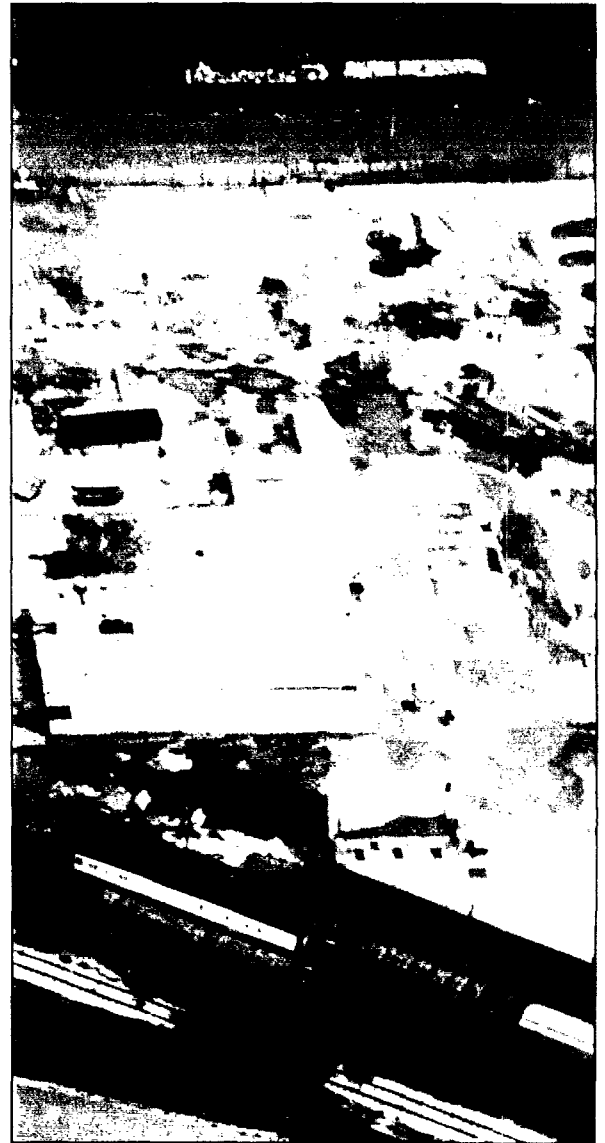
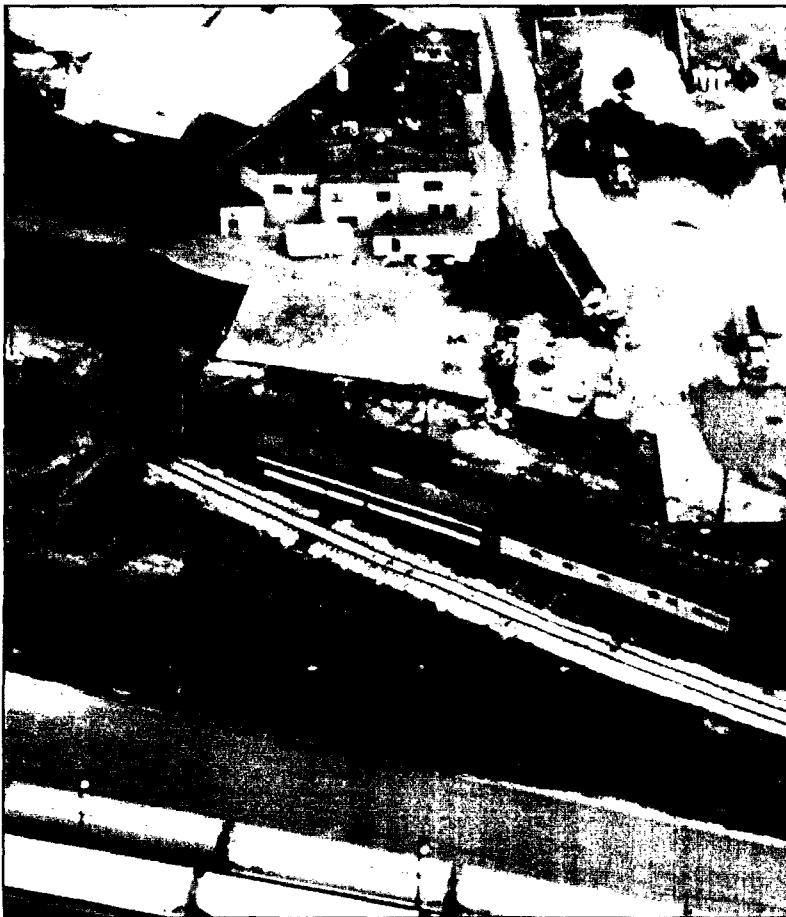
*Prepared:
January 19, 1998*

*Leading the
Nation in
Customer
Care*

Engineering Evaluation and Cost Analysis (EE/CA) Data Report



for the
Master Metals, Inc. Site



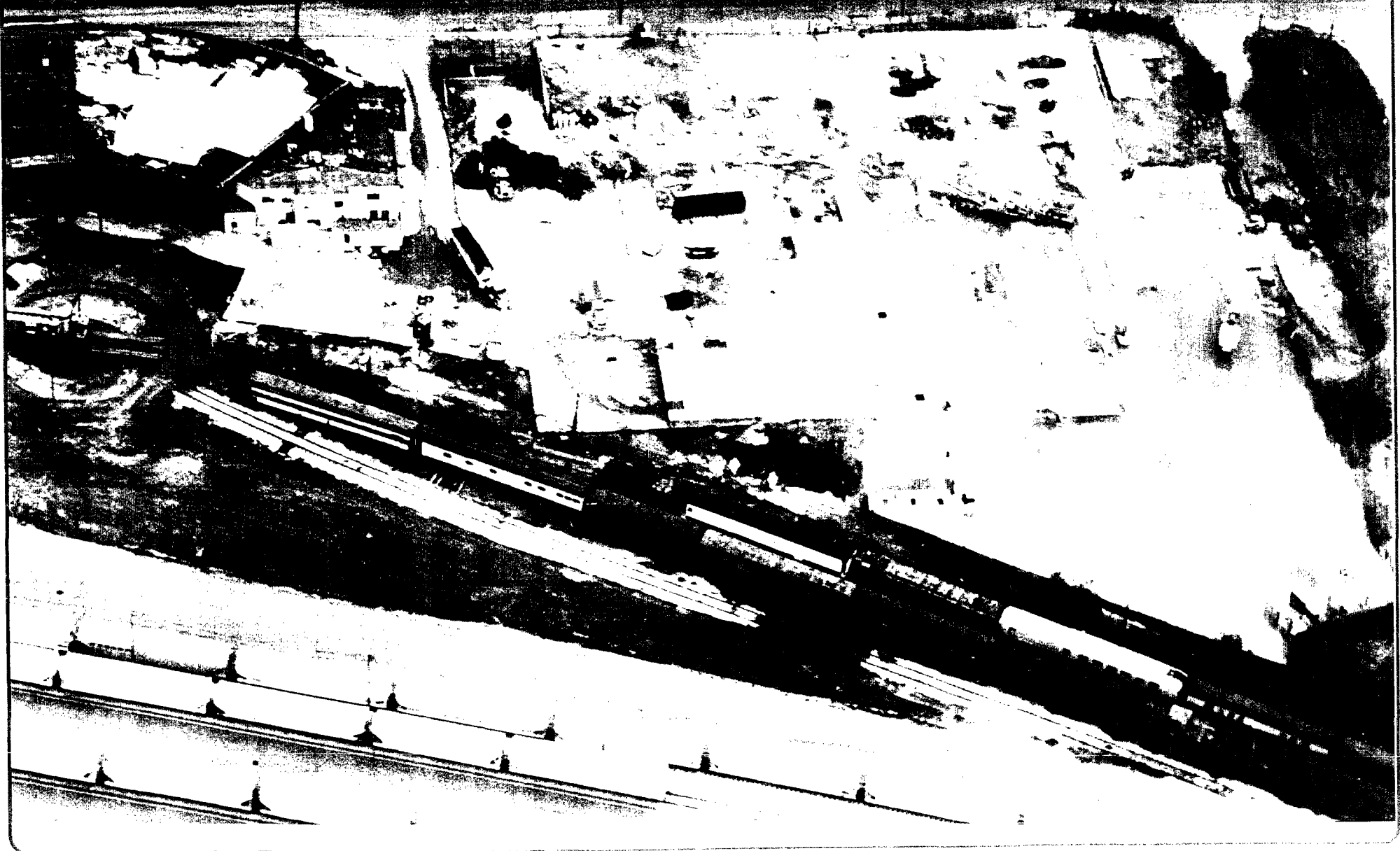
Prepared by:

ENTACT, Inc.
January 19, 1998

Master Metals, Inc. Site

Cleveland, Ohio

ENTACT



Engineering Evaluation and Cost Analysis (EE/CA) Data Report

Master Metals, Inc. Site
Cleveland, Ohio

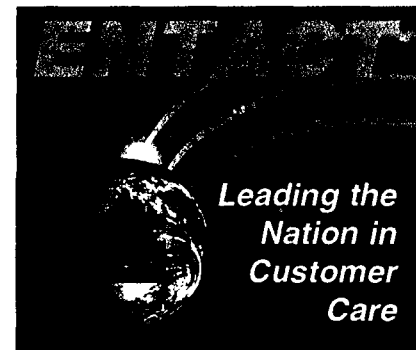


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SECTION 1 Introduction

This document presents the Engineering Evaluation and Cost Analysis (EE/CA) Data Report for the Master Metals, Inc. (MMI) site in Cleveland, Ohio. The EE/CA document is being prepared by ENTACT Inc. (ENTACT) in response to the Administrative Order by Consent pursuant to Section 106 of CERCLA (Administrative Order) issued on April 17, 1997 by the Environmental Protection Agency Region 5 (EPA).

The Administrative Order requires a two-phased response action at the MMI site:

1. Phase I consists of the time-critical removal actions which commenced at the MMI site on June 9, 1997 and were completed on December 6, 1997.
2. Phase II involves development and submission of an EE/CA Report to assess alternative response actions.

The Administrative Order Section V. 2 designates work to be performed. Sub-Section 2.2 of the Administrative Order requires the Phase II EE/CA Report in accordance with a scope of work (SOW) attached to the Administrative Order. That SOW lists five tasks to be completed as part of the EE/CA process. The EE/CA Support Sampling Plan (Task 2) was prepared on October 1, 1997. The approved EE/CA Support Sampling (Task 3) took place from November 11, 1997 through December 21, 1997. This EE/CA Data Report is submitted to satisfy Task 4 of the SOW.

SECTION 2 Site Background

2.1 Site Description

The Master Metals Site is located at 2850 West Third Street, Cleveland, Cuyahoga County, Ohio. The site consists of two contiguous parcels totaling approximately 4.3 acres. The MMI property is roughly a right triangle-shaped property with the southeast corner being the 90 degree angle. The site is bounded on the northwest by railyards owned by the Baltimore and Ohio railroad, on the south by a dead end road, and on the east by West Third Street. The site is enclosed by a ten foot chain link fence. The site is in a heavily industrialized area. LTV Steel owns the property to the north and south of the site.

The Cuyahoga River is approximately 0.5 miles east of the site and flows north toward Lake Erie. Topographic maps suggest that the direction of groundwater and surface water flow in the vicinity of the MMI site is to the northeast. The water table is at a depth of approximately ten feet below the ground surface.

Surface soils in the area are comprised of fill materials (cinders, slag, sand), and to a lesser extent, native soils (sand, silt, clay) deposited as glacial till or river alluvium. At the MMI site, concrete covers approximately 90 percent of the surface with fill materials, consisting of sand, cinders, slag, and gravel, covering the remaining surface areas.

The MMI facility is located on top of slag fill material that was reportedly deposited throughout the area during industrial development in the early 1900s. NL Industries, Inc. had operated at the site from 1932 to 1979. MMI purchased the site in 1979 and continued the existing site usage as a secondary lead smelter. The MMI facility ceased operations in 1993 after a history of environmental violations.

The major features of the site included an office building, numerous storage areas, two baghouses, and a deteriorated smelter building. In 1997, ENTACT began decontamination/demolition operations as part of a time-critical removal at the Master Metals site. All buildings except the office building have been razed. All remaining feedstock and debris materials have been either decontaminat-

ed and/or treated and transported and disposed of as either special waste or disposed as hazardous waste.

2.2 Data Collection Activities

2.2.1 On-Site Sampling

Compliance Technologies, Inc. (CTI) conducted a Phase II environmental assessment of the MMI site in 1990. Thirty-four subsurface samples were collected and analyzed for eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver). Soil samples were collected from two to five feet in depth and eight to ten feet in depth. Results revealed lead concentrations which were 1-2 orders of magnitude higher than the other metals. Slightly elevated concentrations of chromium and cadmium were observed in only 17 of the 34 samples.

In July, 1992, Ecology and Environment (on behalf of the U.S. EPA) collected seven surface samples on-site. This investigation analyzed samples for the eight RCRA metals (arsenic, cadmium, chromium, lead, mercury, barium, silver, and selenium). Once again, lead values were 1-2 orders of magnitude higher than all other metals. Some results exhibited minor arsenic, barium, cadmium, and chromium concentrations, relative to lead concentrations.

As part of the time-critical removal conducted by ENTACT, all exposed on-site surface areas (e.g., not covered by concrete) were excavated to a minimum depth of two feet or until slag fill materials (e.g., slag, cinders, etc.) were encountered. Figure 2-1 shows the areas which



Excavated grids from on-site surface areas (Grids F1 - A1)

were excavated as part of the time critical phase. Table 2-1 lists the XRF extent of contamination survey results for lead along with a description of the materials remaining in each grid. Slag fill materials were encountered in two-thirds of the grid locations. The average lead concentration remaining after excavation of the forty-eight grids is 7.550 mg/kg.

The 1990 and 1992 historical sampling events showed elevated lead concentrations were detected in the drum/container and battery storage areas at a depth of approximately three to five feet. The lateral extent, however, had not been defined. Therefore, five supplemental borings were performed to define the lateral extent of contamination in these two areas. In addition, two borings were performed adjacent to the furnace building basement to assess residual contamination which may exist at depth in this area.

Subsurface samples collected from the borings were segmented into six-inch intervals for the upper one foot and one foot intervals thereafter. Each interval was screened for total lead with the XRF. The first sample interval exhibiting XRF values less than 1000 mg/kg was submitted to the laboratory for total metal analysis (arsenic, cadmium, chromium, and lead).

2.2.2 Perimeter Sampling

In July 1992, Ecology and Environment (on behalf of U.S. EPA) collected samples proximate to the facility property to determine if the facility contaminants were subject to airborne transport. Analysis of these samples for RCRA metals showed total lead levels of 24,000 - 43,100 ppm. Based on this information, an XRF survey was conducted around the perimeter of the facility to fully assess the potential for lead impacts.

The outside fence perimeter of the facility was divided into minimum one hundred foot lengths. Perimeter locations behind the roundhouse were divided into fifty foot segments to ensure a sufficient number of XRF samples in this area. Once surface XRF lead values had been determined, one boring was installed to approximately three feet on each side of the facility at the XRF location exhibiting the highest XRF lead value. Subsurface samples collected from the borings were segmented into six-inch intervals for the upper one foot and one foot intervals

thereafter. Each sample interval was screened with the XRF for total lead. The first sample interval exhibiting the XRF value below 1000 mg/kg was collected and submitted to the laboratory for total metals analysis (arsenic, cadmium, chromium, and lead).

2.2.3 Off-Site Samples

In July 1993, off-site surface samples were collected by Ecology and Environment (on behalf of U.S. EPA) from locations 0.4 miles northwest and west of the site. These samples were collected near residential areas and indicated lead concentrations from 148 to 1,850 ppm.



Sampling activities along Quigley Ave.

In order to resolve any off-site data gaps, off-site surface sampling was conducted along Quigley Avenue (west of the site and east of the 1993 sampling event) to determine if Master Metals operations could have impacted the residential neighborhood located 0.4 miles to the northwest. ENTACT collected nine samples along Quigley Ave. The exact location of the samples was dependent on the ability to locate areas along Quigley Ave. which had not been impacted by any industrial operations. Three samples were collected approximately southwest of the site, three samples to the west of the site, and three samples to the northwest of the site. These samples were collected at the 0-3" depth. All samples were sent to the laboratory for analysis of total lead.

2.2.4 Groundwater

In December 1990, Master Metals contracted with CTI to install and sample four groundwater monitoring wells on the Master Metals site. Groundwater is not used as a

source of drinking water within a four mile radius of the MMI site. Lake Erie supplies the greater Cleveland area with its drinking water.



Field filtering for dissolved metals

As part of the EE/CA support sampling, ENTACT conducted a survey in an attempt to locate the CTI wells. ENTACT located all four monitoring wells. Three of the four wells were intact for the purposes of sampling. The fourth well was located between the battery storage area and the furnace building. Upon discovery, it was noticed that the protective cover and cast iron collar had been removed. The well had significant amounts of material within the wellhead. Several inches of material were

extracted from the well. However, the well was not opened. Due to the deteriorated condition of this well, ENTACT determined that only three wells were intact for the purposes of sampling. The three groundwater samples were analyzed for total and dissolved metals (arsenic, cadmium, chromium, and lead) to evaluate constituent concentrations residing in the aquifer as compared to the 1991 sampling conducted by CTI. In addition, ENTACT analyzed the dissolved concentrations of these same metals to assess the actual concentrations of constituent metals in the groundwater. Dissolved metal samples were field filtered prior to packaging and shipping.

2.2.5 On-site Sump Investigation

There are several surface sewer covers on the MMI property. ENTACT sealed any sewer covers on the property prior to beginning any Phase I demolition. However, Doug Mickey, site owner, was in the process of installing a sump configuration around the property to collect sediment and allow stormwater and other liquids to flow to one central sump location. ENTACT performed a subsurface video investigation of the sumps (where possible) and associated piping as part of this EE/CA support sampling plan to confirm the direction and condition of the on-site piping system.

* Note:

Do not use filtered GW samples in risk assessment.

MASTER METALS

SITE

Cleveland, Ohio

Figure 2-1
XRF EXTENT OF CONTAMINATION SURVEY

ENTACT
January 1998

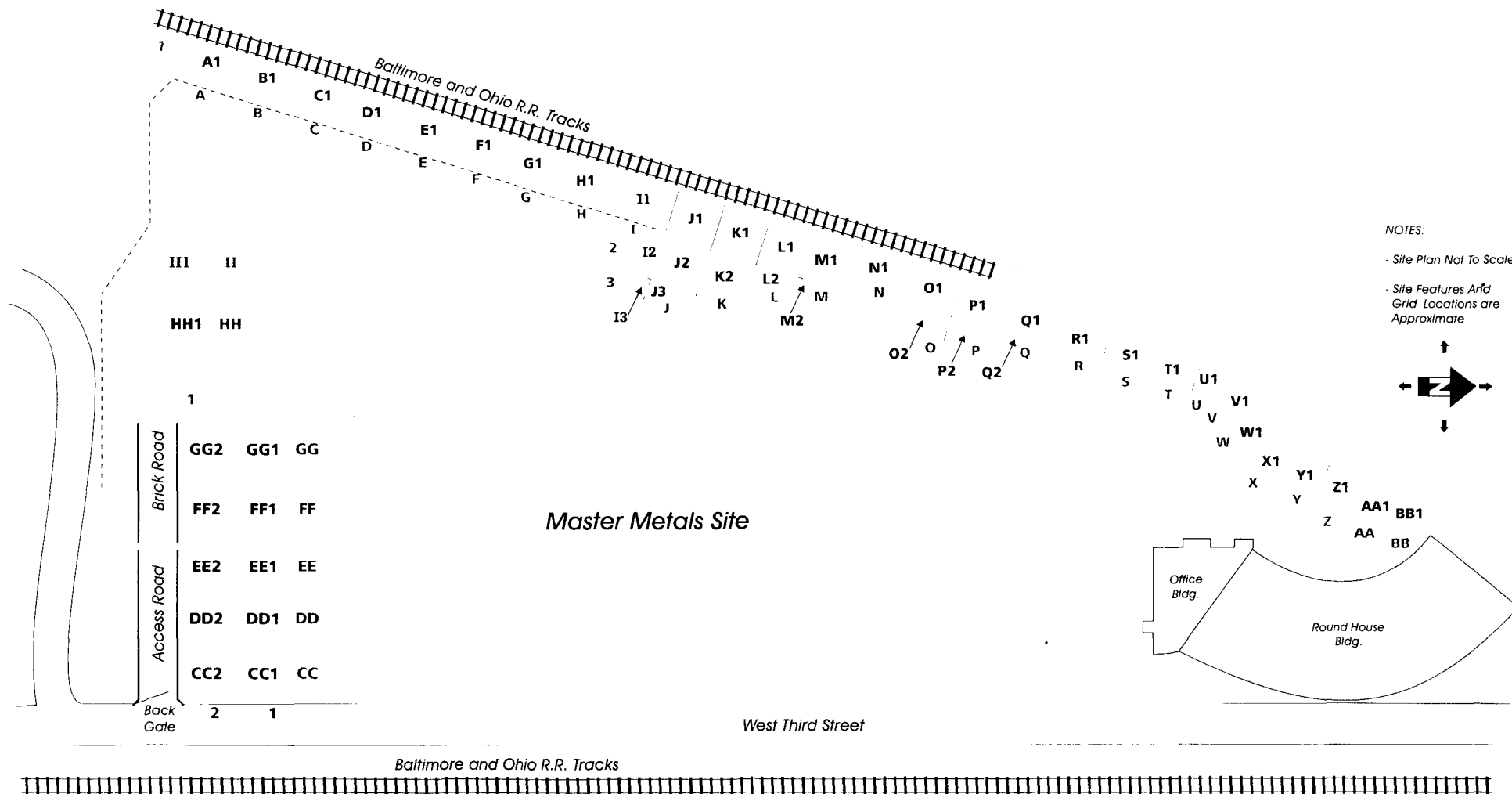


TABLE 2-1

XRF Extent of Contamination Survey

Grid	Total Lead (ppm)				Description
	1	2	3	average	
A1	310	1300	3570	1727	dk gray slag/ black cinders
B1	3390	35560	39340	26097	dk gray slag/ black cinders
C1	584	985	1699	1089	lt gray slag/ black cinders
D1	15540	26460	14140	18713	lt gray slag/ black cinders
E1	8770	1081	7110	5654	lt gray slag/ black cinders
F1	768	6640	683	2697	lt gray slag/ black cinders
G1	2910	28700	6560	12723	lt gray-rust slag/ black cinders
H1	3530	6650	26370	12183	lt gray-rust slag/ black cinders
I1	767	23730	12590	12362	white sludge
I2	297	4655	19840	8264	dk brown slag
I3	17145	3275	30120	16847	brown, rust slag
J1	766	6220	820	2602	white sludge
J2	185	702	11575	4154	black, dk brown, rust slag
J3	9895	20220	701	10272	black, brown, rust slag
K1	35	58	20910	7001	white sludge
K2	347	3900	30265	11504	black, dk brown, brown slag
K3	62	4414	313	1596	white sludge/ dk brown slag
L1	139	174	698	337	white sludge
L2	31930	14130	59555	35205	gray slag/gravel
M1	4225	8665	31205	14698	brown, gray slag/gravel
M2	15510	12945	15415	14623	gray, brown slag
N1	3995	5590	8430	6005	brown slag
O1	6090	15490	4380	8653	black, dk brown, rust slag
O2	26760	5660	15650	16023	brown, gray, rust slag/gravel
P1	510	1010	3935	1818	brown slag/gravel, tan coarse sand
P2	14165	19255	7855	13758	gray slag fines/gravel
Q1	103	2295	770	1056	brown slag/tan-gray coarse sand
R1	39450	38570	499	26173	white sludge/ lt gray slag/ cinders
S1	2594	25890	5590	11358	white sludge/ dk gray slag/ cinders
T1	388	648	8220	3085	white sludge/ gray cinders
U1	9260	3630	709	4533	white sludge/ gray-black cinders
V1	552	674	4270	1832	brown, rust slag/ cinders
W1	25	2680	4180	2295	black, brown, rust slag
X1	1436	8685	6235	5452	black, brown, rust slag
Y1	5690	4190	123	3334	black, brown, rust slag
Z1	1450	4440	51	1980	black, brown, rust slag
AA1	930	51	25	335	tan coarse sand/gravel
BB1	481	110	180	257	tan coarse sand/gravel

TABLE 2-1

XRF Extent of Contamination Survey

Grid	Total Lead (ppm)				Description
	1	2	3	average	
CC1	5400	14850	4840	8363	brown coarse sand/gravel, white-gray slag
CC2	9860	10380	6570	8937	brown coarse sand/gravel, white-gray slag
DD1	15720	1836	3350	6969	lt brown coarse sand/gravel
DD2	1596	5000	3020	3205	white-gray slag, brown sand/gravel
EE1	1720	106	272	699	tan coarse sand/gravel
EE2	1120	327	380	609	tan coarse sand/gravel
FF1	740	1716	2506	1654	brown coarse sand/small gravel
FF2	248	2618	1531	1466	brown coarse sand/ small gravel
GG1	1667	1645	130	1147	brown coarse sand/ small gravel
GG2	178	2586	1104	1289	brown coarse sand/ small gravel

SECTION 3 Sampling and Analysis Results

3.1 Statement of Objectives

The EE/CA Sampling and Analysis Plan (dated October 1, 1997) contains the procedures and methods to determine the extent of on-site and off-site lead impacts at the Master Metals Site. On-site sampling was conducted by installing borings and collecting samples to assess lateral extent of contamination (EOC) from the drum storage and battery storage areas. Borings were also collected from around the facility perimeter to assess contamination at depth. Finally, surface samples were collected along Quigley Ave. to assess the potential for airborne lead impacts from Master Metals operations. All sample identifications, sampling procedures, field logbooks and chain of custody documentation procedures were followed as described in the EE/CA Sampling and Analysis Plan (dated October 1, 1997).

3.2 On-Site Sample Results

Seven borings were installed on-site in the vicinity of the Battery Storage Area, Drum and Container Storage Area, and the Former Rotary Furnaces. Figure 3-1 shows the locations of on-site borings ONS-01 through ONS-07. The borings were installed to approximately four feet. However, due to compaction, recovery was three feet or less. The segments were screened for total lead with the XRF. Table 3-2 lists the XRF screening results and material descriptions for each boring interval. Only two borings (ONS-02 and ONS-03) exhibit significant XRF lead reductions with depth. Five of the seven on-site borings

exceeded 1,500 ppm lead at depth. The soil descriptions state that much of the material encountered at three to four feet depth is slag. Based on this information, there is significant lead contamination at depth on-site. This is consistent with the information collected from the soil excavation and XRF surveying done as part of the time-critical removal (see Section 2.2.1).

Table 3-3 shows the laboratory verification data for total arsenic, total cadmium, total chromium, and total lead. The verification data shows that the primary metal of concern is lead. In addition, the laboratory data confirms the XRF screening information regarding significant lead contamination at depth.

3.3 Perimeter Sample Results

Figure 3-1 shows the approximate location of the perimeter XRF lead survey samples (designated X-1 through X-19). Table 3-1 contains the XRF survey results. The XRF lead concentrations varied from 931 ppm lead at sample location X-8 to 36,587 ppm lead at sample location X-10. Based on these results, soil borings were installed at sample locations X-4 (3,360 ppm lead), X-7 (10,307 ppm), X-10 (36,587 ppm), and X-15 (21,237 ppm) with boring identifications PS-01 through PS-04, respectively. These boring locations are depicted in Figure 3-1.

Table 3-2 presents the boring screening results. Although the surficial XRF lead readings were as high as 36,587



Geoprobe sampling in former furnace area (Boring ONS-03)



EE/CA perimeter sample collection activities

ppm, the lead concentration decreased quickly with depth. At boring locations PS-01, PS-02, and PS-03 the lead XRF screening value of 1000 ppm was reached at the 12"-24" depth segment. Boring location PS-04 reached the XRF screening value at the 24"-36" depth segment. These sample intervals were sent to the laboratory for arsenic, lead, cadmium, and chromium analysis. The laboratory results are shown on Table 3-3. The laboratory results confirm that extent of lead contamination has been determined with respect to perimeter soils.

3.4 Off-Site Sample Results

The nine surface soil sample locations collected along Quigley Avenue are shown on Figure 3-2. These sample locations (OS-01-03 through OS-09-03) were visually selected. Selection criteria were based on locations least likely to be impacted by any industrial or commercial operations. This selection rationale allowed data assessment of potential airborne lead impacts from the Master Metals facility.

The laboratory derived total lead concentrations for soil are tabulated on Figure 3-2. The concentrations ranged from 85 mg/kg to 1,200 mg/kg. The average lead concentration of the nine investigative samples and the one duplicate sample was 375 mg/kg. This average lead concentration is lower than the Superfund residential soil screening level of 400 mg/kg. It should be noted that the highest lead concentration was located at OS-08-03. This sample was collected within 500 feet of the I-490 bypass. Therefore, this value may be indicative of historical lead contamination from a source other than Master Metals such as lead based paint from the bypass structure or leaded gasoline from motorized vehicles.

In addition, this lead concentration profile is completely consistent with the report "Lead Monitoring Study Around Master Metals Inc. and LTV Steel Company" (Mark Conti, USEPA, January 1996) in which the following two observations were made:

- ▶ The wind rose indicates that the wind blows to the northwest only 2-4% of the time.
- ▶ 90 percent of the air emissions decrease within 0.25 miles of the site.

Based on the aforementioned facts, it is evident that there are no airborne lead impacts attributable to Master Metals in the vicinity of Quigley Avenue and beyond.

3.5 Groundwater Sample Results

Figure 3-3 shows the location of the three remaining monitoring wells at Master Metals, the total and dissolved groundwater metal concentrations found during this sampling event, and the groundwater monitoring results for the 1991 CTI sampling. Monitoring wells MW-02 and MW-03 exhibit concentrations of total arsenic, total cadmium, total chromium, and total lead ranging from 0.011 mg/L to 10.8 mg/L. Monitoring well MW-02 exhibits total metal concentrations which are an order of magnitude greater than monitoring well MW-03. However, monitoring well MW-02 was bailed dry and when the well recovered, the groundwater sample was significantly more turbid than the sample from MW-03 resulting in the anomalous concentrations. As can be seen from the dissolved metal concentrations, field filtering of samples MW-02 and MW-03 exhibit the same relative metal concentrations (arsenic and lead).

The comparison of the CTI sampling results with the recent sampling results show that:

- ▶ The metal constituent concentrations in MW-01 decreased from the levels found in the 1991 sampling. Lead is the only detectable metal at 31 parts per billion.
- ▶ The metal constituent levels in MW-02 are significantly higher for arsenic and lead. However, as discussed previously, sample representativeness was the reason for the elevated concentrations.
- ▶ The current metal constituent levels in MW-03 vary from those determined in 1991. Arsenic and lead levels increased while cadmium and chromium concentrations decreased. However, the metal concentrations of these two sampling events have the same relative magnitude.

As stated in the EE/CA workplan, the groundwater in this area will not be a source of drinking water. More importantly, the concentrations of total arsenic, total cadmium,

total chromium, and total lead in the aquifer has not increased in six years and has actually decreased in MW-01. From these facts, it is evident that heavy metals from this site are not partitioning to the groundwater and moving off site. Therefore, groundwater does not warrant further investigation or remediation.

3.6 On-Site Sump Assessment

Figure 3-4 shows the location of existing sumps and sewers at the Master Metals facility. As part of the Phase I time-critical removal action, ENTACT removed all sludge contained in all sumps and all competent piping which connected to each sump. This material was then treated and disposed accordingly. Then, ENTACT subcontracted a sewer cleaning company to perform site reconnaissance to determine the status of the existing sump network through video surveying. ENTACT identified thirteen (13) square sumps: two in the southern section of the



Sump system cleaning activities



Video survey of sump system

roundhouse, two in the battery breaking area, and nine around the former white metals building and former brick baghouses.

The nine sumps around the baghouse foundation were being installed by Master Metals when their operations were shut down. The sump system was being constructed by placing precast concrete tanks subgrade and connecting between sumps with four inch plastic tubing to gravity feed water to a central location. The two sumps in the roundhouse are stand alone water collection units. The sump and subgrade tank in the battery breaking area worked in concert to collect acid from battery processing activities. Neither the battery breaking area sumps nor the roundhouse sumps connect to any other portions of the sump system. All sumps were found to be sound based on visual inspection.

There are ten round drain covers on the site. Three of the covers are cleanouts or floor drains that were located in the former white metals building, the shipping and receiving building, and the furnace building. These cleanouts and floor drains are not interconnected to any other sump or drain. Another drain was located in the truck ramp area. This drain was not investigated because it was not part of the on-site waste stream system and it is spatially distinct from other waste stream pathways. The remaining six on-site covers were manhole covers yielding access to a subsurface network of conduits. According to the sewer investigation experts, the cover located outside the roundhouse was abandoned and inoperable. The sewer cover located in the south central portion of site is the access for a 36-inch diameter line flowing east to west. Two 8-inch clay tiles connect to the main line of this manhole. One flows into the 36-inch line from the north and the other flows into the 36-inch line from the southwestern direction.

Three of the four sewer covers and the garage drain located near the office building were also inspected. These sewers were cleaned out to facilitate investigation. It should be noted that there was no evidence to support flowing water in any of these three sewers. In addition, it was evident that attempts had been made to internally concrete these sewers. After sediment and sludge removal, it was determined that each of these manholes

contained only one line entering/exiting the catch basin. None of these lines are connected to any other sumps or sewers on the property.

3.7 Quality Assurance/Quality Control (QA/QC)

Field QA/QC included the collection of field duplicates and field blanks to assess the accuracy of the sampling program. For the on-site sampling program, one field duplicate sample (ONS-D) was collected. This sample was a duplicate of sample ONS-06-06. As seen in Table 3-3, the metals concentrations for these two samples show excellent agreement.

Two field duplicates were collected for the four perimeter samples. This is because sample PS-04 was collected on a different day than the other three samples. Field duplicate PS-D corresponds to sample PS-03-24 whereas duplicate sample PS-04-D corresponds to sample PS-04-36 (see Table 3). Again, excellent accuracy is seen in the metals results. Figure 3-2 shows the field duplicate sample OS-D lead concentration agrees very well with the investigative sample lead concentration OS-06-03. Lastly, Figure 3-3 states that field duplicate sample MW-00 has the exact same total and dissolved metal concentrations as the investigative sample MW-01.

Six field blanks were collected during the course of this project. At least one field blank was collected for each matrix and one field blank was collected for ten or fewer investigative samples. There were no metal concentrations in either the off-site field blank or the perimeter soil field blanks. The groundwater field blank exhibited a

lead concentration of 0.006 ppm, just above the detection limit of 0.005 ppm. Two on-site sample field blanks exhibited lead concentrations of 0.034 ppm and 1.57 ppm. All of these concentrations are minor and did not impact any of the analytical data.

Assessment of the laboratory QA/QC noticed that one sample (PS-04-36) was analyzed by the method of standard addition because the matrix spike/matrix spike duplicate was out of control. The method of standard addition determined a value of 6.6 parts per billion which corresponds well to the 4.6 part per billion value of the duplicate sample.

The only anomaly in the entire EE/CA Support Sampling analytical sequence was the initial calibration verification (ICVS) for certain arsenic and lead samples. There was insufficient information recorded in the laboratory standards tracking logbooks to confirm the true value of the second source ICVS which was used to verify the calibration standards. However, this was not critical to the primary standardization of the samples involved.

Overall, ENTACT collected 60 field XRF samples and 23 laboratory samples. The support sampling plan anticipated collection of 64 field XRF samples and 24 laboratory samples. Based on this information, ENTACT achieved 94% field completeness and 96% laboratory completeness for this project. The goal for field and laboratory completeness was 90%.

In order to determine the accuracy of the XRF total lead analysis, ENTACT performed a regression analysis of the laboratory vs. XRF total lead data sets. Table 3-4 lists the XRF lead and laboratory values and Figure 3-5 shows the log-log scatter regression. According to "Field Portable X-ray Fluorescence," U.S. EPA / ERT, Quality Assurance Technical Information Bulletin, Volume 1, Number 4, dated May 1991, the regression analysis of laboratory vs. XRF data sets must have a coefficient of determination of 0.7 or greater to meet QA2 objectives. The coefficient of determination for the laboratory vs. XRF total lead data sets for the EE/CA was 0.906. This indicates that the data produced by the XRF was accurate and met objectives.

All holding times for laboratory analyses were met. All analytical data and chain of custodies can be found in Appendix A. The full analytical data package including all raw data is submitted as a separate Appendix B.

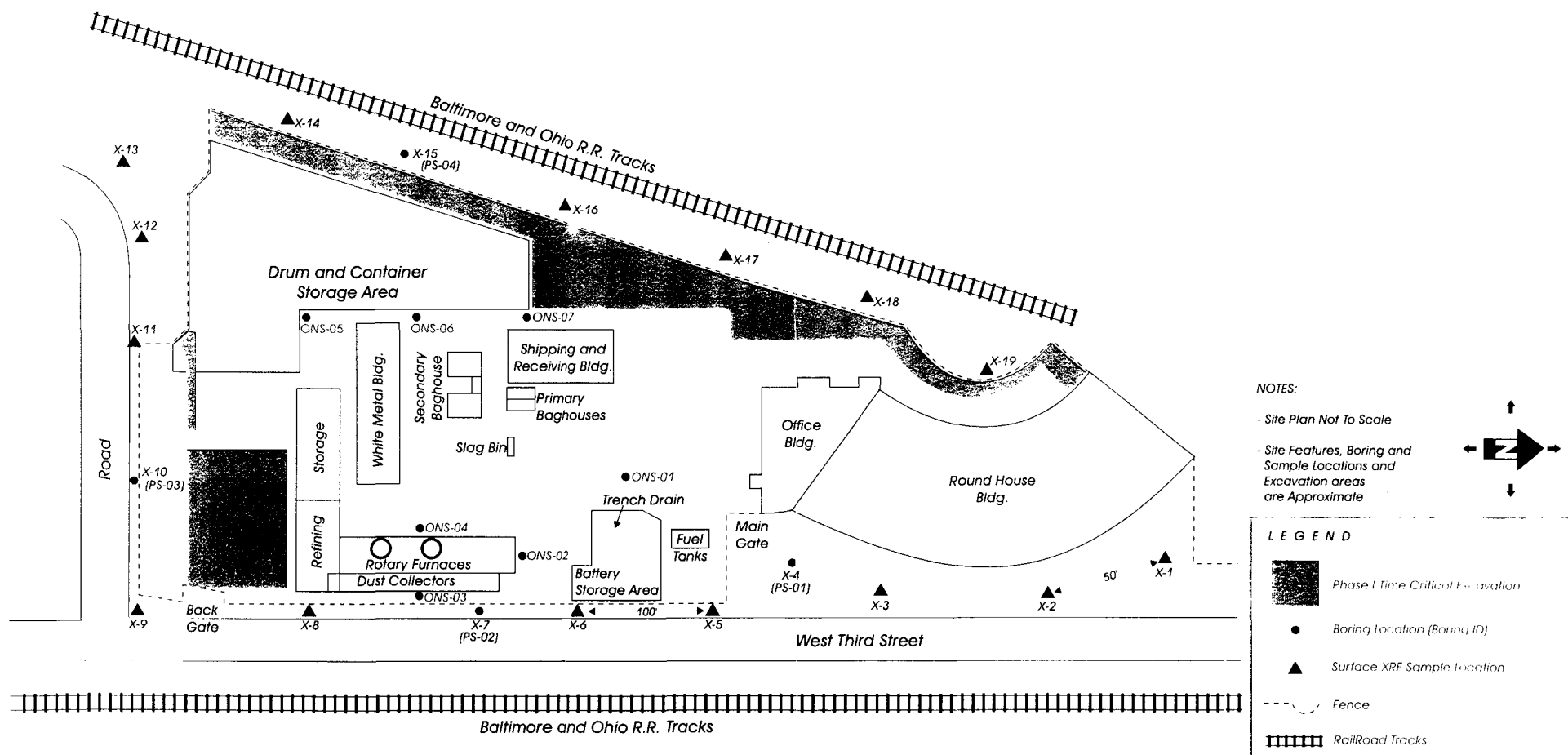


Field Blank sample collection activities

Figure 3-1

PERIMETER AND ON-SITE SOLLING PLAN

ENTACT
 Environmental
 Engineering



**MASTER METALS
SITE**
Cleveland, Ohio

Figure 3-2
OFF SITE SAMPLE LOCATIONS AND LEAD CONCENTRATIONS (mg/kg)

ENR/ACT
January 1998

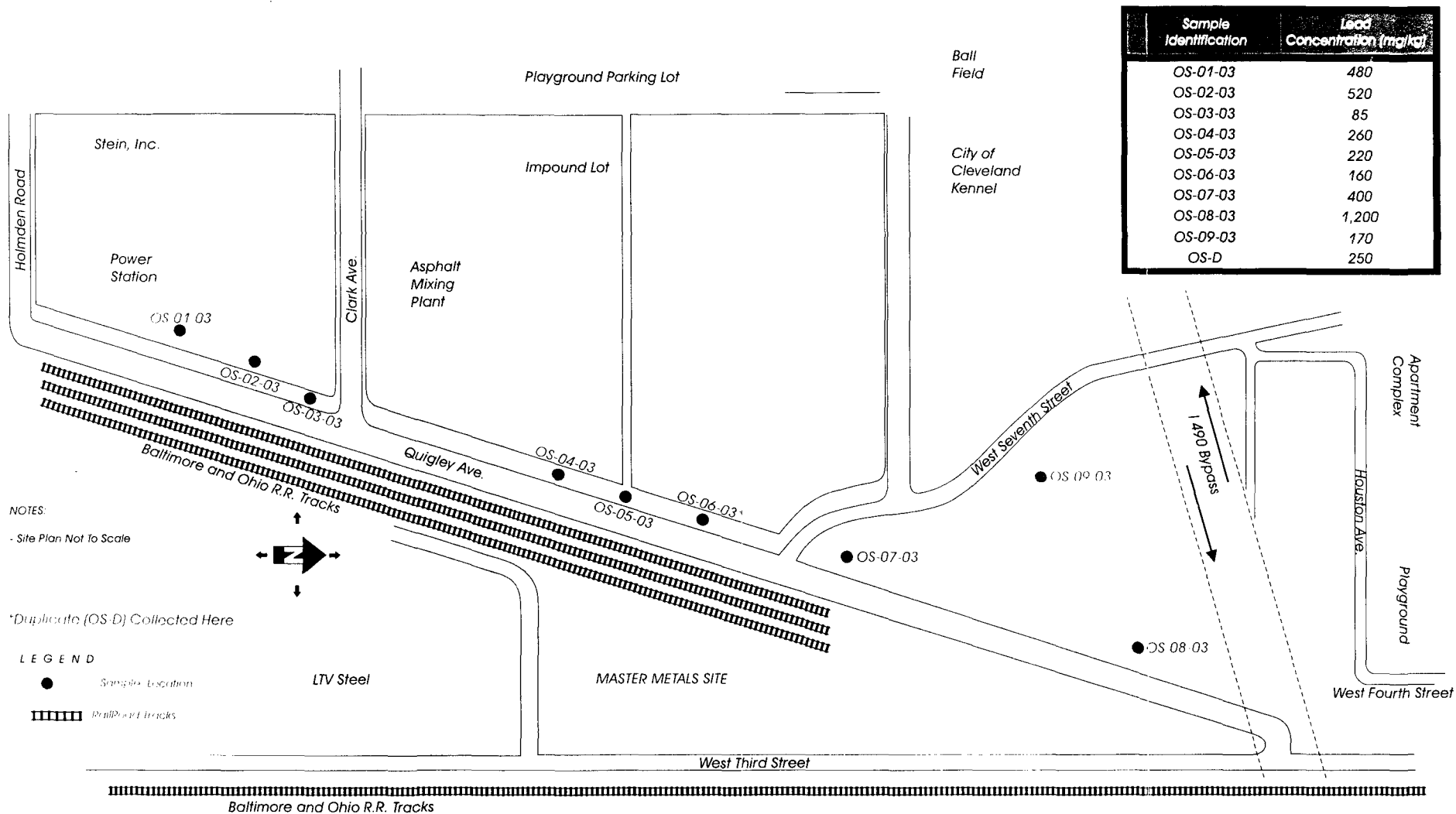


Figure 3-3

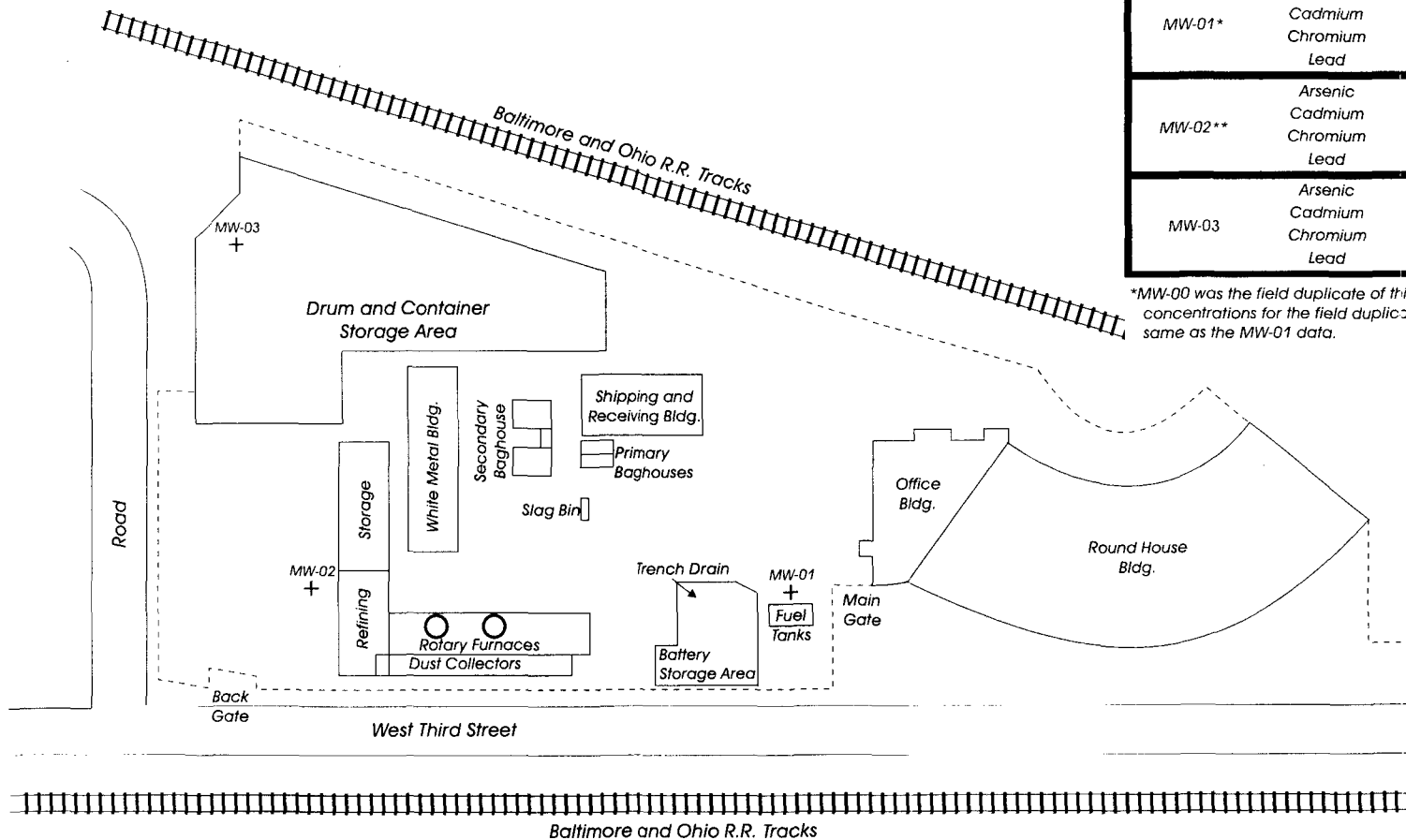
**GROUNDWATER SAMPLING LOCATIONS
AND METAL CONCENTRATIONS (mg/kg)**

ENTACT
January 1992

MW-01*	Arsenic	ND (<0.005)	ND (<0.005)	
	Cadmium	ND (<0.010)	ND (<0.010)	
	Chromium	ND (<0.040)	ND (<0.040)	
	Lead	0.031	ND (<0.005)	
MW-02**	Arsenic	1.28	0.348	
	Cadmium	0.074	ND (<0.010)	
	Chromium	0.137	ND (<0.040)	
	Lead	10.8	0.015	
MW-03	Arsenic	0.114	0.010	
	Cadmium	0.011	ND (<0.010)	
	Chromium	0.040	ND (<0.040)	
	Lead	1.19	0.035	

*MW-00 was the field duplicate of this well. The metal concentrations for the field duplicate were exactly the same as the MW-01 data.

**Well Bailed Dry



NOTES:

- Site Plan Not To Scale
- Site Features And Well Locations are Approximate

LEGEND

- MW-# Monitoring Well Location
- + Monitoring Well Location
- - - - - Fence
- ||||| Railroad Tracks

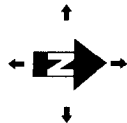


Figure 3-4
SEWER AND SUMP LOCATIONS

ENTACT
 January 1988

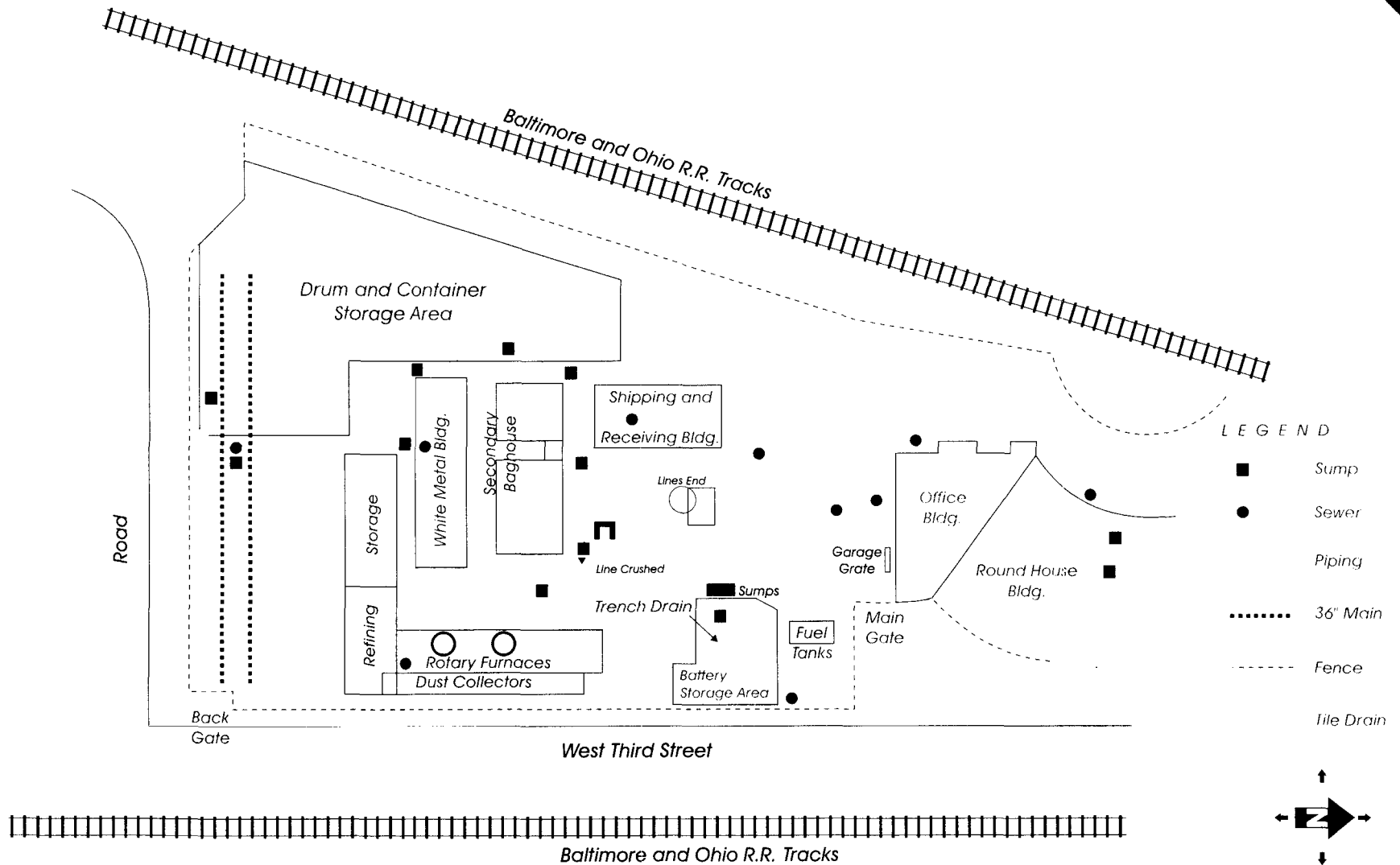


Figure 3-5
XRF Lead - Laboratory Lead Correlation

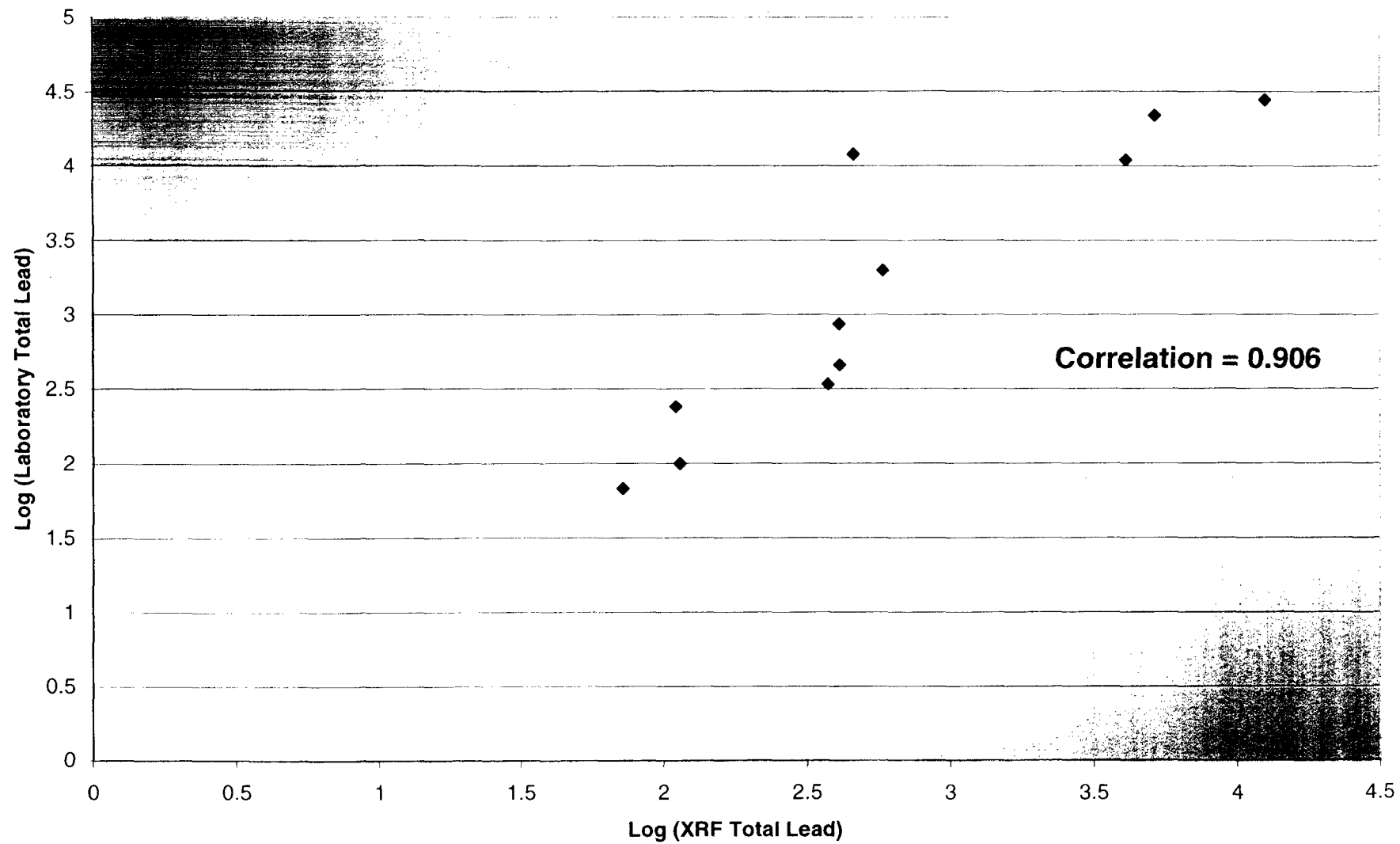


TABLE 3-1
PERIMETER XRF SAMPLES

<u>SAMPLE ID</u>	<u>LOCATION</u>	<u>TOTAL Pb XRF RESULTS (ppm)</u>			<u>AVERAGE</u>
		1	2	3	
X-1	E border N end	1620	1520	1336	1492
X-2	E border N end	1460	1076	2040	1525
X-3	E border N end	1520	1660	2110	1763
X-4	E border N end	3170	3380	3530	3360
X-5	E border central	4010	5480	5180	4890
X-6	E border central	7280	3050	7970	6100
X-7	E border central	9340	10220	11360	10307
X-8	E border south end	570	1573	650	931
X-9	E border south end	4330	3840	4320	4163
X-10	South border east corner	44060	24430	41270	36587
X-11	South border east central	19400	16070	22930	19467
X-12	South border central	13840	10960	13040	12613
X-13	South border west central	3700	2810	3520	3343
X-14	South border west corner	1750	3760	5310	3607
X-15	West border south end	8820	26970	27920	21237
X-16	West border central	11570	15330	20340	15747
X-17	West border central	5570	7340	7140	6683
X-18	West border north end	3080	2065	6280	3808
X-19	West border north end	7100	6880	6990	6990

**TABLE 3-2
BORING SCREENING RESULTS**

BORING ID	TOTAL DEPTH (Ft)	RECOVERY	INTERVAL	Total Pb XRF RESULTS (ppm)				DESCRIPTION
				1	2	3	AVERAGE	
PS-01	4'	2'8"	0-6"	5840	5890	4660	5463	brown/black coarse sand and gravel. 50% coarse sand, 50% coarse gravel
			6-12"	1114	1295	3190	1866	black silty sand
			12-24"	73	67	76	72	12-18" - black coal, 18-24" - brown fine-med. sand/little silt
			24-36"	ND	ND	ND	ND	brown/black gravelly crushed slag with large (1-3" dia.) black/gray porous slag fragments
PS-02	3'	1'10"	0-6"	4380	5480	6250	5370	tan/brown med. Sand and fine gravel. 60% med. sand 40% gravel
			6-12"	6760	5670	6280	6237	black/brown silty sand with slag fragments (>1' dia.)
			12-22"	490	372	366	409	12-16" brown silty med. sand. 16-22" black crushed slag with slag fragments
PS-03	4'	4'	0-6"	7840	5160	8230	7077	brown silty med. sand with slag fragments
			6-12"	5570	2720	6530	4940	brown sandy silt with small rock fragments with organic mat. (roots, grass)
			12-24"	310	445	370	375	brown sandy silt with some clay. Small coal and brick fragments
			24-36"	58	39	32	43	brown sandy silt some clay
			36-48"	ND	22	59	<50	brown sandy silt some clay
PS-04	4'	4'	0-6"	3220	5060	4400	4227	black silty med. Sand. 10% rock fragments
			6-12"	1087	3490	3060	2546	black silty med. sand. 5% rock fragments
			12-24"	1339	1440	869	1216	black silty med. Sand. 5% rock fragments
			24-36"	115	122	106	114	black silty med. Sand and crushed fine black slag (30%)
			36-48"	253	184	238	225	black silty med. Sand and crushed fine black slag (30%)

**TABLE 3-2
BORING SCREENING RESULTS**

BORING ID	TOTAL DEPTH (Ft)	RECOVERY	INTERVAL	Total Pb XRF RESULTS (ppm)				DESCRIPTION
				1	2	3	AVERAGE	
ONS-01	2'	approx 1.5'	0-6"	9170	13460	8670	10433	coarse sand and gravel with large rock fragments (>1" dia.) 30% rock fragments
			6-12"	6400	8470	8340	7737	brown coarse sand and gravel with 20% blue/gray slag fragments and brick
			12-18"	9560	15180	13000	12580	12-14" brown sandy silt. 14-16" blue/gray porous slag fragments (>1in. Dia.)
ONS-02	4'	approx 2.5'	0-6"	5700	5630	7860	6397	brown sandy silt with <5% slag fragments
			6-12"	1253	1584	1260	1366	brown/black med-course sand with some silt. Black slag fragments <5%
			12-24"	439	443	354	412	black coarse sand with some silt. 10% orange brick (>2in. Dia.) 5% white/black porous slag and small coal fragments
			24-36"	96	173	293	187	black coarse sand with 30% light yellow porous slag with shale fragments and brick
ONS-03	4'	approx 3'	0-6"	23220	33510	28770	28500	black coarse sandy silt with <10% gray porous slag material
			6-12"	8670	8700	11850	9740	brown sandy silt with some clay and small shale fragments
			12-24"	436	670	640	582	brown/orange clayey silt <5% gray slag fragments
			24-36"	553	554	284	464	24-30" dark brown coarse sand. 30-36" slag fragments (>1" dia.)
ONS-04	4'	approx 3'	0-6"	12800	11190	12210	12067	brown silty sand with <20% brick
			6-12"	439	566	381	462	brown sandy clay with <5% black slag and rock fragments
			12-24"	33	54	69	52	brown/tan sandy silt with small slag fragments (<5%)
			24-36"	818	1640	2350	1603	black to dark red coarse sand(40%) and silt(50%). 10% red brick and large gray slag fragments (>1" dia.)

**TABLE 3-2
BORING SCREENING RESULTS**

BORING ID	TOTAL DEPTH (Ft)	RECOVERY	INTERVAL	XRF RESULTS Total Pb (ppm)				DESCRIPTION
				1	2	3	AVERAGE	
ONS-05	4'	approx 2.5	0-6"	5070	15600	9910	10193	black/brown sand and gravel with some gray slag fragments (10%)
			6-12"	4600	3500	7160	5087	light gray to black sand with slag fragments (50%)
			12-24"	4990	2510	4870	4123	crushed gray/black slag with large fragments(>1 in. dia.)
ONS-06	4'	approx 2.5'	0-6"	76	95	158	110	brown silty sand with small gray slag fragments (<5%)
			6-12"	17640	19180	9240	15353	black to gray sand and gravel size slag with large black slag fragments
			12-24"	1840	2240	3070	2383	12-18" large (>2in dia.) black slag fragments with fine gravel. 18-24" coarse black gravel and sand (wet) exhibits oily appearance and odor. 18-24" not analyzed with XRF due to high moisture content
ONS-07	2.5'	approx 2'	0-6"	36830	25850	40280	34320	brown silty sand with small slag fragments (+ battery component terminal. Boring taken at a location absent of concrete)
			6-12"	1310	1230	1834	1458	brown sandy silt with some gravel(10%)
			12-24"	3550	4270	7700	5173	brown sandy clay with 50% brick and slag

TABLE 3-3**LABORATORY VERIFICATION DATA**

SAMPLE ID	LABORATORY CONCENTRATIONS (MG/KG)			
	ARSENIC	CADMIUM	CHROMIUM	LEAD
PS-01-24	7.4	0.74	12	68
PS-02-24	7.8	1.7	390	870
PS-03-24	11	1.2	9.8	340
PS-04-36	6.6	0.83	12	100
PS-04-D	4.6	0.57	7.9	63
PS-D	10	1.1	9.6	360
ONS-01-24	80	44	19	28,000
ONS-02-24	7.9	82	9.5	460
ONS-03-24	61	51	9	2,000
ONS-04-12	59	57	14	12,000
ONS-05-24	67	24	23	11,000
ONS-06-06	8	220	7.9	240
ONS-07-24	100	23	16	22,000
ONS-D	8	160	7.4	250

TABLE 3-4
COMPARISON OF XRF TOTAL LEAD VALUES TO LABORATORY TOTAL LEAD VALUES

SAMPLE ID	XRF Total Pb (ppm)	LABORATORY Total Pb (ppm)
PS-01-24	72	68
PS-02-24	409	870
PS-03-24	375	340
PS-04-36	114	100
ONS-01-24	12580	28000
ONS-02-24	412	460
ONS-03-24	582	2000
ONS-04-12	462	12000
ONS-05-24	4123	11000
ONS-06-06	110	240
ONS-07-24	5173	22000

SECTION 4 Conclusion

The EE/CA Support Sampling was performed in order to determine the extent of contamination from the Master Metals facility for on-site and off-site soils, groundwater and sewer system facilities, piping and media. Based on this sampling event and the Phase I excavation and XRF screening activities, the following conclusions can be drawn:

- ▶ Based on extensive historical and EE/CA derived sampling, lead is the only hazardous constituent of concern at the Master Metals facility.
- ▶ On-site solid media has significant lead contamination (up to 35,000 mg/kg) to a depth of three to four feet. This level of contamination cannot be isolated to a few localized areas on-site. Both the XRF survey of the excavated southern and western on-site grids and the lateral extent of contamination borings exhibit lead concentrations at depth in the vicinity of 10,000 mg/kg. Forty-eight excavated grids exhibited an average of 7,550 mg/kg lead (XRF-derived) while six borings exhibited an average of approximately 12,500 mg/kg lead (laboratory-derived).

- ▶ Perimeter solid media proximate to the facility fence exhibit surficial lead concentrations from approximately 1,000 mg/kg to 36,000 mg/kg. However, the lead concentrations decrease rapidly with depth. Lead concentrations are below 1,000 mg/kg at a depth of twelve to twenty-four inches.
- ▶ Off-site soil samples collected along Quigley Avenue had an average lead concentration of 375 mg/kg. This average lead concentration is lower than the Superfund residential soil screening level of 400 mg/kg. Therefore, it is evident that there are no airborne lead impacts attributable to Master Metals in the vicinity of Quigley Avenue and beyond.
- ▶ Groundwater sampling results indicate heavy metals from this site are not partitioning to the groundwater and moving off site. Therefore, groundwater does not warrant further investigation or remediation.

Based on the comprehensive data collection and data assessment program undertaken at Master Metals, ENTACT has provided extensive information about the rate and extent of contamination at and around this facility for all media.



ENTACT

Appendix

A



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(800) 807-2877

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/20/1997

NET Job Number: 97.13651

IEPA Cert. No.: 100221
WDNR Cert. No.: 999447130
A2LA Cert. No.: 0453-01

Enclosed is the Analytical and Quality Control reports for the following samples submitted to Bartlett Division of NET, Inc. for analysis.

Project Description: EEICA Master Metals, Cleveland

Sample Number	Sample Description	Date Taken	Date Received
443345	05-01-03	11/10/1997	11/12/1997
443346	05-02-03	11/10/1997	11/12/1997
443347	05-03-03	11/10/1997	11/12/1997
443348	05-04-03	11/10/1997	11/12/1997
443349	05-05-03	11/10/1997	11/12/1997
443350	FB-001	11/10/1997	11/12/1997
443351	05-06-03	11/10/1997	11/12/1997
443352	05-D	11/10/1997	11/12/1997
443353	05-07-03	11/10/1997	11/12/1997
443354	05-08-03	11/10/1997	11/12/1997
443355	05-09-03	11/10/1997	11/12/1997

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. These results apply only to the samples analyzed. Reproduction of this report only in whole is permitted. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Procedures used follow NET Standard Operating Procedures which reference the methods listed on your report. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

This Quality Control report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

Approved by:

Mary Pearson
Project Manager



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/20/1997

Sample No. : 443346

NET Job No.: 97.13651

Sample Description: 05-02-03
EEICA Master Metals, Cleveland

Date Taken: 11/10/1997
Time Taken: 13:53
IEPA Cert. No. 100221

Date Received: 11/12/1997
Time Received: 11:32
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	75.7	%	11/17/1997	0.1	ctl	1999	2540 (4)
Lead, ICP	520	mg/kg	11/20/1997	4.0	kdw	890 1789	6010 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/20/1997

Sample No. : 443348

NET Job No.: 97.13651

Sample Description: 05-04-03
EEICA Master Metals, Cleveland

Date Taken: 11/10/1997
Time Taken: 14:46
IEPA Cert. No. 100221

Date Received: 11/12/1997
Time Received: 11:32
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	88.6	%	11/17/1997	0.1	ttl	1999	2540 (4)
Lead, ICP	260	mg/kg	11/20/1997	4.0	kdw	890 1789	6010 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/20/1997

Sample No. : 443350

NET Job No.: 97.13651

Sample Description: FB-001
EEICA Master Metals, Cleveland

Date Taken: 11/10/1997
Time Taken: 15:03
IEPA Cert. No. 100221

Date Received: 11/12/1997
Time Received: 11:32
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Lead, GFAA	<0.0050	mg/L	11/19/1997	0.0050	mhp	1078 1865	7421 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/20/1997

Sample No. : 443352

NET Job No.: 97.13651

Sample Description: 05-D
EEICA Master Metals, Cleveland

Date Taken: 11/10/1997
Time Taken: 15:20
IEPA Cert. No. 100221

Date Received: 11/12/1997
Time Received: 11:32
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	92.8	%	11/17/1997	0.1	tcl	1999	2540 (4)
Lead, ICP	250	mg/kg	11/17/1997	4.0	kdw	890 1785	6010 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/20/1997

Sample No. : 443354

NET Job No.: 97.13651

Sample Description: 05-08-03
EEICA Master Metals, Cleveland

Date Taken: 11/10/1997
Time Taken: 15:45
IEPA Cert. No. 100221

Date Received: 11/12/1997
Time Received: 11:32
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	84.0	%	11/17/1997	0.1	tcl	1999	2540 (4)
Lead, ICP	1,200	mg/kg	11/20/1997	4.0	kdw	891 1789	6010 (1)



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QUALITY CONTROL REPORT

INITIAL CALIBRATION VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/20/1997

NET Job Number: 97.13651

Analyte	Run Batch Number	ICV True Conc.	Conc. Found	Percent Recovery
Lead, GFAA	1865	*	0.0349	
Lead, GFAA	1867	*	0.0343	
Lead, ICP	1785	1.00	1.00	100.0
Lead, ICP	1787	1.00	1.06	106.0
Lead, ICP	1789	1.00	1.01	101.0

* See case narrative in Level 4 data package.



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QUALITY CONTROL REPORT

CONTINUING CALIBRATION BLANK VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/20/1997

NET Job Number: 97.13651

Analyte	Run Batch Number	Blank Analysis Results	Units	Reporting Limit	Analytical Method
Lead, GFAA	1865	<0.0050	mg/L	0.0050	7421 (1)
Lead, GFAA	1865	<0.0050	mg/L	0.0050	7421 (1)
Lead, GFAA	1865	<0.0050	mg/L	0.0050	7421 (1)
Lead, GFAA	1867	<0.0050	mg/L	0.0050	7421 (1)
Lead, ICP	1785	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1785	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1785	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1787	<4.0	ug/g	4.0	6010B(9)
Lead, ICP	1787	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1787	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1787	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1787	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1789	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1789	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1789	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1789	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1789	<4.0	ug/g	4.0	6010 (1)

Advisory Control Limits for Blanks:

All compounds should be less than the Reporting Limit, except for phthalate esters, toluene, methylene chloride, acetone and chloroform should be less than 5 times the Reporting Limit.

00018



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QUALITY CONTROL REPORT

LABORATORY CONTROL STANDARD

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/20/1997

NET Job Number: 97.13651

Analyte	Prep Batch Number	Run Batch Number	True Conc.	Conc. Found	LCS % Recovery
Lead, GFAA	1078	1867	0.0200	0.0198	99.0
Lead, ICP	890	1785	50.0	51.1	102.3
Lead, ICP	891	1787	50.0	53.5	107.0

00020



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QUALITY CONTROL REPORT

DUPLICATES

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/20/1997

NET Job Number: 97.13651

Analyte	Prep	Run	Original	Duplicate	Units	RPD
	Batch	Batch				
	Number	Number				
Solids, Total		1999	87.8	89.4	%	1.8
Solids, Total		1999	66.8	68.8	%	2.9

NOTE: Spikes and Duplicates may not be samples from this job.

RPD - Relative Percent Difference

Advisory Control Limits for Duplicates - RPD should be less than 20.

00022



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443693

NET Job No.: 97.13726

Sample Description: FRN-N
Master Metals

Date Taken: 11/12/1997
Time Taken: 13:45
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	80.3	%	11/14/1997	0.1	tcl	1998	2540 (4)
Arsenic, ICP	40	mg/kg	11/21/1997	10	kdw	892 1481	6010 (1)
Cadmium, ICP	29	mg/kg	11/21/1997	0.50	kdw	892 1595	6010 (1)
Chromium, ICP	11	mg/kg	11/21/1997	2.0	kdw	892 1568	6010 (1)
Lead, ICP	11,000	mg/kg	11/24/1997	4.0	kdw	892 1796	6010 (1)



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Fax: (815) 874-5622
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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443695

NET Job No.: 97.13726

Sample Description: FRN-S
Master Metals

Date Taken: 11/12/1997
Time Taken: 13:55
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	93.3	%	11/14/1997	0.1	ttl	1998	2540 (4)
Arsenic, ICP	<10	mg/kg	11/21/1997	10	kdw	892 1481	6010 (1)
Cadmium, ICP	2.3	mg/kg	11/21/1997	0.50	kdw	892 1585	6010 (1)
Chromium, ICP	5.3	mg/kg	11/21/1997	2.0	kdw	892 1568	6010 (1)
Lead, ICP	300	mg/kg	11/21/1997	4.0	kdw	892 1793	6010 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443697

NET Job No.: 97.13726

Sample Description: FB-FRN
Master Metals

Date Taken: 11/12/1997
Time Taken: 14:03
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, ICP	<0.20	mg/L	11/20/1997	0.20	kdw	1764 2936	6010 (1)
Cadmium, ICP	<0.010	mg/L	11/20/1997	0.010	kdw	1764 2904	6010 (1)
Chromium, ICP	<0.040	mg/L	11/20/1997	0.040	kdw	1764 2902	6010 (1)
Lead, ICP	<0.080	mg/L	11/20/1997	0.080	kdw	1764 3115	6010 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443699

NET Job No.: 97.13726

Sample Description: MWT-01
Master Metals

Date Taken: 11/12/1997
Time Taken: 14:38
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	<0.0050	mg/L	01/12/1998	0.0050	jtt	1111 938	7060 (1)
Cadmium, ICP	<0.010	mg/L	01/12/1998	0.010	jtt	1821 3000	6010B(9)
Chromium, ICP	<0.040	mg/L	01/12/1998	0.040	jtt	1821 2998	6010B(9)
Lead, GFAA	0.0308	mg/L	01/09/1998	0.0050	jtt	1111 1910	7421 (1)

CORRECTED REPORT



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443701

NET Job No.: 97.13726

Sample Description: MWT-00
Master Metals

Date Taken: 11/12/1997
Time Taken:
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	<0.0050	mg/L	01/12/1998	0.0050	jtt	1111 938	7060 (1)
Cadmium, ICP	<0.010	mg/L	01/12/1998	0.010	jtt	1821 3000	6010B(9)
Chromium, ICP	<0.040	mg/L	01/12/1998	0.040	jtt	1821 2998	6010B(9)
Lead, GFAA	0.0327	mg/L	01/09/1998	0.0050	jtt	1111 1910	7421 (1)

CORRECTED REPORT



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443703

NET Job No.: 97.13726

Sample Description: MWD-02
Master Metals

Date Taken: 11/12/1997
Time Taken: 15:15
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	0.348	mg/L	11/21/1997	0.0050	mhp	1078 912	7060 (1)
Cadmium, ICP	<0.010	mg/L	11/20/1997	0.010	kdw	1764 2904	6010 (1)
Chromium, ICP	<0.040	mg/L	11/20/1997	0.040	kdw	1764 2902	6010 (1)
Lead, GFAA	0.015	mg/L	11/19/1997	0.0050	mhp	1078 1865	7421 (1)



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443705

NET Job No.: 97.13726

Sample Description: MWD-03
Master Metals

Date Taken: 11/12/1997
Time Taken: 15:03
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:40
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	0.010	mg/L	11/21/1997	0.0050	mhp	1078 912	7060 (1)
Cadmium, ICP	<0.010	mg/L	11/20/1997	0.010	kdw	1764 2904	6010 (1)
Chromium, ICP	<0.040	mg/L	11/20/1997	0.040	kdw	1764 2902	6010 (1)
Lead, GFAA	0.035	mg/L	11/19/1997	0.0050	mhp	1078 1865	7421 (1)



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CASE NARRATIVE

Mr. Mike DeRosa
ENTACT
1360 Wooddale Road
Suite A
Wooddale, IL 60191

01/15/1997

NET Job Number: 97.13726

Page 1 of 2

Project Description: Master Metals

Sample Number	Sample Description	Date Taken	Date Received
443693	FRN-N	11/12/1997	11/13/1997
443694	FRN-E	11/12/1997	11/13/1997
443695	FRN-S	11/12/1997	11/13/1997
443696	FRN-W	11/12/1997	11/13/1997
443697	FB-FRN	11/12/1997	11/13/1997
443698	MWD-01	11/12/1997	11/13/1997
443699	MWT-01	11/12/1997	11/13/1997
443700	MWD-00	11/12/1997	11/13/1997
443701	MWT-00	11/12/1997	11/13/1997
443702	MWT-02	11/12/1997	11/13/1997
443703	MWD-02	11/12/1997	11/13/1997
443704	MWT-03	11/12/1997	11/13/1997
443705	MWD-03	11/12/1997	11/13/1997
443706	FB-004	11/12/1997	11/13/1997

The following comments should be noted for the indicated fraction;

Samples 443698-443701: During tertiary data review, it was determined that the laboratory analysts did not properly prepare these samples as requested on the chain of custody. The sample retains were located and the samples were subsequently digested properly and analyzed. The analytical report has been corrected to reflect the correct data and dates of analysis.

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms.

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QUALITY CONTROL REPORT

INITIAL CALIBRATION VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13726

Analyte	Run Batch Number	ICV True Conc.	Conc. Found	Percent Recovery
Arsenic, ICP	2936	1.00	1.00	100.0
Arsenic, GFAA	910	*	0.0450	
Arsenic, GFAA	912	*	0.0458	
Arsenic, GFAA	938	0.0200	0.0206	103.0
Cadmium, ICP	2904	1.00	1.02	102.0
Cadmium, ICP	3000	1.00	0.978	97.8
Chromium, ICP	2902	1.00	1.05	105.0
Chromium, ICP	2998	1.00	1.01	101.0
Lead, ICP	3115	1.00	1.03	103.0
Lead, GFAA	1865	*	0.0343	
Lead, GFAA	1867	*	0.0349	
Lead, GFAA	1910	0.0200	0.0203	101.5
Lead, GFAA	1911	0.0200	0.0208	104.0
Arsenic, ICP	1478	1.00	0.985	98.5
Arsenic, ICP	1481	1.00	0.975	97.5
Cadmium, ICP	1582	1.00	0.989	98.9
Cadmium, ICP	1585	1.00	0.993	99.3
Chromium, ICP	1565	1.00	1.00	100.0
Chromium, ICP	1568	1.00	1.01	101.0
Lead, ICP	1790	1.00	1.01	101.0
Lead, ICP	1793	1.00	0.998	99.8
Lead, ICP	1796	1.00	1.01	101.0

* See case narrative in Level 4 data package.

ICV - Initial Calibration Verification (Second Source)

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QUALITY CONTROL REPORT

CONTINUING CALIBRATION VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13726

Analyte	Run Batch Number	CCV True Conc.	Conc. Found	Percent Recovery
Lead, ICP	3115	2.00	1.96	98.0
Lead, ICP	3115	2.00	1.96	98.0
Lead, ICP	3115	2.00	1.97	98.5
Lead, ICP	3115	2.00	1.94	97.0
Lead, GFAA	1865	0.0250	0.0258	103.2
Lead, GFAA	1865	0.0250	0.0268	107.2
Lead, GFAA	1865	0.0250	0.0270	108.0
Lead, GFAA	1865	0.0250	0.0247	98.8
Lead, GFAA	1865	0.0250	0.0250	100.0
Lead, GFAA	1865	0.0250	0.0250	100.0
Lead, GFAA	1865	0.0250	0.0261	104.4
Lead, GFAA	1865	0.0250	0.0261	104.4
Lead, GFAA	1867	0.0250	0.0258	103.2
Lead, GFAA	1867	0.0250	0.0256	102.4
Lead, GFAA	1867	0.0250	0.0258	103.2
Lead, GFAA	1867	0.0250	0.0240	96.0
Lead, GFAA	1910	0.0250	0.0240	96.0
Lead, GFAA	1910	0.0250	0.0259	103.6
Lead, GFAA	1911	0.0250	0.0248	99.2
Lead, GFAA	1911	0.0250	0.0238	95.2
Arsenic, ICP	1478	2.0	1.90	95.0
Arsenic, ICP	1478	2.0	1.91	95.5
Arsenic, ICP	1478	2.0	1.93	96.5
Arsenic, ICP	1478	2.0	1.94	97.0
Arsenic, ICP	1478	2.0	1.94	97.0
Arsenic, ICP	1478	2.0	1.93	96.5
Arsenic, ICP	1481	2.0	1.93	96.5
Arsenic, ICP	1481	2.0	1.94	97.0
Arsenic, ICP	1481	2.0	1.94	97.0
Arsenic, ICP	1481	2.0	1.95	97.5

CCV - Continuing Calibration Verification

00073



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QUALITY CONTROL REPORT

CONTINUING CALIBRATION BLANK ANALYSIS

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13726

Analyte	Run Batch Number	CCB Results	Units	Reporting Limit	Analytical Method
Arsenic, ICP	2936	<0.20	mg/L	0.20	6010 (1)
Arsenic, ICP	2936	<0.20	mg/L	0.20	6010 (1)
Arsenic, ICP	2936	<0.20	mg/L	0.20	6010 (1)
Arsenic, ICP	2936	<0.20	mg/L	0.20	6010 (1)
Arsenic, GFAA	910	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	912	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	912	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	912	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	938	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	938	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	938	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	938	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	938	<0.0050	mg/L	0.0050	7060 (1)
Cadmium, ICP	2904	<0.010	mg/L	0.010	6010 (1)
Cadmium, ICP	2904	<0.010	mg/L	0.010	6010 (1)
Cadmium, ICP	2904	<0.010	mg/L	0.010	6010 (1)
Cadmium, ICP	2904	<0.010	mg/L	0.010	6010 (1)
Cadmium, ICP	3000	<0.010	mg/L	0.010	6010B(9)
Cadmium, ICP	3000	<0.010	mg/L	0.010	6010B(9)
Chromium, ICP	2902	<0.040	mg/L	0.040	6010 (1)
Chromium, ICP	2902	<0.040	mg/L	0.040	6010 (1)
Chromium, ICP	2902	<0.040	mg/L	0.040	6010 (1)
Chromium, ICP	2902	<0.040	mg/L	0.040	6010 (1)
Chromium, ICP	2998	<0.040	mg/L	0.040	6010B(9)
Chromium, ICP	2998	<0.040	mg/L	0.040	6010B(9)
Lead, ICP	3115	<0.080	mg/L	0.080	6010 (1)
Lead, ICP	3115	<0.080	mg/L	0.080	6010 (1)
Lead, ICP	3115	<0.080	mg/L	0.080	6010 (1)
Lead, ICP	3115	<0.080	mg/L	0.080	6010 (1)

CCB - Continuing Calibration Blank Verification

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QUALITY CONTROL REPORT

CONTINUING CALIBRATION BLANK ANALYSIS

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13726

Analyte	Run Batch Number	CCB Results	Units	Reporting Limit	Analytical Method
Chromium, ICP	1565	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1565	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1565	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1565	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1565	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1565	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1568	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1568	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1568	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1568	<2.0	ug/g	2.0	6010 (1)
Lead, ICP	1790	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1790	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1790	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1790	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1790	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1790	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1793	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1793	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1793	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1793	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1796	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	1796	<4.0	ug/g	4.0	6010 (1)

CCB - Continuing Calibration Blank Verification

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QUALITY CONTROL REPORT

LABORATORY CONTROL STANDARD

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13726

Analyte	Prep Batch Number	Run Batch Number	True Conc.	Conc. Found	LCS % Recovery
Arsenic, ICP	1764	2936	1.0	1.07	107.0
Arsenic, GFAA	1078	910	0.020	0.0206	103.0
Arsenic, GFAA	1111	938	0.020	0.0200	100.0
Cadmium, ICP	1764	2904	0.500	0.535	107.0
Cadmium, ICP	1821	3000	0.500	0.495	99.0
Chromium, ICP	1764	2902	1.00	1.08	108.0
Chromium, ICP	1821	2998	1.00	1.00	100.0
Lead, ICP	1764	3115	1.00	1.08	108.0
Lead, GFAA	1078	1867	0.0200	0.0198	99.0
Lead, GFAA	1111	1910	0.0200	0.0180	90.0
Arsenic, ICP	892	1478	50.0	51.0	102.0
Cadmium, ICP	892	1582	25.0	25.8	103.2
Chromium, ICP	892	1565	50.0	52.0	104.0
Lead, ICP	892	1790	50.0	52.0	104.0

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QUALITY CONTROL REPORT

DUPLICATES

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13726

Analyte	Prep Batch Number	Run Batch Number	Original Analysis	Duplicate Analysis	Units	RPD
Solids, Total		1998	91.6	91.9	%	0.3
Solids, Total		1998	95.2	95.1	%	0.1
Solids, Total		1998	91.8	92.7	%	1.0

NOTE: Spikes and Duplicates may not be samples from this job.

RPD - Relative Percent Difference

Advisory Control Limits for Duplicates - RPD should be less than 20.

00001



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443707

NET Job No.: 97.13727

Sample Description: PS-01-24
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 14:54
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	93.6	%	11/14/1997	0.1	ttl	1998	2540 (4)
Arsenic, GFAA	7.4	mg/kg	11/21/1997	0.50	mhp	72 426	7060 (1)
Cadmium, ICP	0.74	mg/kg	11/24/1997	0.50	kdw	893 1587	6010 (1)
Chromium, ICP	12	mg/kg	11/24/1997	2.0	kdw	893 1570	6010 (1)
Lead, ICP	68	icp mg/kg	11/24/1997	4.0	kdw	893 158	6010 (1)

CORRECTED REPORT

icp : Parameter analysis was performed by ICP rather than GFAA.



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(800) 807-2877

ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443709

NET Job No.: 97.13727

Sample Description: PS-03-24
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 16:20
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	94.6	%	11/14/1997	0.1	tcl	1998	2540 (4)
Arsenic, GFAA	11	mg/kg	11/21/1997	0.50	mhp	72 426	7060 (1)
Cadmium, ICP	1.2	mg/kg	11/24/1997	0.50	kdw	893 1587	6010 (1)
Chromium, ICP	9.8	mg/kg	11/24/1997	2.0	kdw	893 1570	6010 (1)
Lead, ICP	340	icp mg/kg	11/24/1997	4.0	kdw	893 158	6010 (1)

CORRECTED REPORT

icp : Parameter analysis was performed by ICP rather than GFAA.



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443711

NET Job No.: 97.13727

Sample Description: ONS-01-24
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 17:11
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	91.8	%	11/14/1997	0.1	ttl	1998	2540 (4)
Arsenic, ICP	80	icp mg/kg	11/24/1997	10	kdw	893 428	7060 (1)
Cadmium, ICP	44	mg/kg	11/24/1997	0.50	kdw	893 1587	6010 (1)
Chromium, ICP	19	mg/kg	11/24/1997	2.0	kdw	893 1570	6010 (1)
Lead, ICP	28,000	icp mg/kg	11/24/1997	4.0	kdw	893 160	6010 (1)

CORRECTED REPORT

icp : Parameter analysis was performed by ICP rather than GFAA.



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443713

NET Job No.: 97.13727

Sample Description: ONS-03-24
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 18:52
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	86.8	%	11/14/1997	0.1	tcl	1998	2540 (4)
Arsenic, ICP	61	icp mg/kg	11/24/1997	10	kdw	893 428	6010 (1)
Cadmium, ICP	51	mg/kg	11/24/1997	0.50	kdw	893 1587	6010 (1)
Chromium, ICP	9.0	mg/kg	11/24/1997	2.0	kdw	893 1570	6010 (1)
Lead, ICP	2,000	icp mg/kg	11/24/1997	0.25	kdw	893 158	6010 (1)

CORRECTED REPORT

icp : Parameter analysis was performed by ICP rather than GFAA.



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443715

NET Job No.: 97.13727

Sample Description: ONS-05-24
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 20:40
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	93.9	%	11/14/1997	0.1	ttl	1998	2540 (4)
Arsenic, ICP	67	icp mg/kg	11/24/1997	10	kdw	893 428	6010 (1)
Cadmium, ICP	24	mg/kg	11/24/1997	0.50	kdw	893 1587	6010 (1)
Chromium, ICP	23	mg/kg	11/24/1997	2.0	kdw	893 1570	6010 (1)
Lead, ICP	11,000	icp mg/kg	11/24/1997	4.0	kdw	893 158	6010 (1)

CORRECTED REPORT

icp : Parameter analysis was performed by ICP rather than GFAA.



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443717

NET Job No.: 97.13727

Sample Description: ONS-07-24
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 21:50
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Solids, Total	91.9	†	11/14/1997	0.1	ttl	1998	2540 (4)
Arsenic, ICP	100	icp	11/24/1997	10	kdw	893 428	6010 (1)
Cadmium, ICP	23		11/24/1997	0.50	kdw	893 1587	6010 (1)
Chromium, ICP	16		11/24/1997	2.0	kdw	893 1570	6010 (1)
Lead, ICP	22,000	icp	11/24/1997	4.0	kdw	893 158	6010 (1)

CORRECTED REPORT

icp : Parameter analysis was performed by ICP rather than GFAA.



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

11/25/1997

Sample No. : 443719

NET Job No.: 97.13727

Sample Description: FB-002
Master/EE/CA; Cleveland

Date Taken: 11/11/1997
Time Taken: 10:19
IEPA Cert. No. 100221

Date Received: 11/13/1997
Time Received: 10:35
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	<0.0050	mg/L	11/21/1997	0.0050	mhp	1078 912	7060 (1)
Cadmium, ICP	<0.010	mg/L	11/20/1997	0.010	kdw	1764 2904	6010 (1)
Chromium, ICP	<0.040	mg/L	11/20/1997	0.040	kdw	1764 2902	6010 (1)
Lead, GFAA	0.034	mg/L	11/19/1997	0.0050	mhp	1078 1865	7421 (1)



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QUALITY CONTROL REPORT

INITIAL CALIBRATION VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13727

Analyte	Run Batch Number	ICV True Conc.	Conc. Found	Percent Recovery
Arsenic, GFAA	910	*	0.0450	
Arsenic, GFAA	912/426	*	0.0458	
Cadmium, ICP	2904	1.00	1.02	102.0
Chromium, ICP	2902	1.00	1.05	105.0
Lead, GFAA	1865	*	0.0349	
Lead, GFAA	1865	*	0.0332	
Lead, GFAA	1867	*	0.0343	
Arsenic, ICP	428	1.00	0.977	97.7
Cadmium, ICP	1587	1.00	0.999	99.9
Chromium, ICP	1570	1.00	1.03	103.0
Lead, ICP	158	1.00	1.05	105.0
Lead, ICP	160	1.00	1.01	101.0

* See Case Narrative in Level 4 data package.

ICV - Initial Calibration Verification

00019



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QUALITY CONTROL REPORT

CONTINUING CALIBRATION VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13727

Analyte	Run Batch Number	CCV True Conc.	Conc. Found	Percent Recovery
Arsenic, ICP	428	2.00	1.90	95.0
Arsenic, ICP	428	2.00	1.93	96.5
Arsenic, ICP	428	2.00	1.92	96.0
Arsenic, ICP	428	2.00	1.92	96.0
Arsenic, ICP	428	2.00	1.93	96.5
Cadmium, ICP	1587	1.00	0.967	96.7
Cadmium, ICP	1587	1.00	0.968	96.8
Cadmium, ICP	1587	1.00	0.959	95.9
Cadmium, ICP	1587	1.00	0.976	97.6
Cadmium, ICP	1587	1.00	0.973	97.3
Chromium, ICP	1570	2.00	1.94	97.0
Chromium, ICP	1570	2.00	1.94	97.0
Chromium, ICP	1570	2.00	1.93	96.5
Chromium, ICP	1570	2.00	1.94	97.0
Chromium, ICP	1570	2.00	1.94	97.0
Lead, ICP	158	2.0	1.92	96.0
Lead, ICP	158	2.0	1.96	98.0
Lead, ICP	158	2.0	1.90	95.0
Lead, ICP	158	2.0	1.96	98.0
Lead, ICP	158	2.0	1.96	98.0
Lead, ICP	160	2.0	1.91	95.5
Lead, ICP	160	2.0	1.95	97.5
Lead, ICP	160	2.0	1.91	95.5
Lead, ICP	160	2.0	1.92	96.0
Lead, ICP	160	2.0	1.89	94.5
Lead, ICP	160	2.0	1.86	93.0

CCV - Continuing Calibration Verification

00071



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QUALITY CONTROL REPORT

CONTINUING CALIBRATION BLANK ANALYSIS

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13727

Analyte	Run Batch Number	CCB Results	Units	Reporting Limit	Analytical Method
Arsenic, ICP	428	<10	ug/g	10	6010 (1)
Arsenic, ICP	428	<10	ug/g	10	6010 (1)
Arsenic, ICP	428	<10	ug/g	10	6010 (1)
Arsenic, ICP	428	<10	ug/g	10	6010 (1)
Arsenic, ICP	428	<10	ug/g	10	6010 (1)
Cadmium, ICP	1587	<0.50	ug/g	0.50	6010 (1)
Cadmium, ICP	1587	<0.50	ug/g	0.50	6010 (1)
Cadmium, ICP	1587	<0.50	ug/g	0.50	6010 (1)
Cadmium, ICP	1587	<0.50	ug/g	0.50	6010 (1)
Cadmium, ICP	1587	<0.50	ug/g	0.50	6010 (1)
Chromium, ICP	1570	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1570	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1570	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1570	<2.0	ug/g	2.0	6010 (1)
Chromium, ICP	1570	<2.0	ug/g	2.0	6010 (1)
Lead, ICP	158	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	158	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	158	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	158	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	158	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	160	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	160	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	160	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	160	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	160	<4.0	ug/g	4.0	6010 (1)
Lead, ICP	160	<4.0	ug/g	4.0	6010 (1)

CCB - Continuing Calibration Blank

00023



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QUALITY CONTROL REPORT

LABORATORY CONTROL STANDARD

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13727

Analyte	Prep Batch Number	Run Batch Number	True Conc.	Conc. Found	LCS % Recovery
Arsenic, GFAA	1078	910	0.020	0.0206	103.0
Cadmium, ICP	1764	2904	0.500	0.535	107.0
Chromium, ICP	1764	2902	1.00	1.08	108.0
Lead, GFAA	1078	1865	0.0200	0.0198	99.0
Arsenic, GFAA	72	426	0.020	0.0206	103.0
Arsenic, ICP	893	428	1.00	0.993	99.3
Cadmium, ICP	893	1587	25.0	24.8	99.2
Chromium, ICP	893	1570	50.0	50.0	100.0
Lead, ICP	893	158	50.0	49.2	98.4

00025



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QUALITY CONTROL REPORT

DUPLICATES

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

11/25/1997

NET Job Number: 97.13727

Analyte	Prep Batch Number	Run Batch Number	Original Analysis	Duplicate Analysis	Units	RPD
Solids, Total		1998	91.6	91.9	%	0.3
Solids, Total		1998	95.2	95.1	%	0.1
Solids, Total		1998	91.8	92.7	%	1.0

NOTE: Spikes and Duplicates may not be samples from this job.

RPD - Relative Percent Difference

Advisory Control Limits for Duplicates - RPD should be less than 20.

00027



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

01/06/1998

Sample No. : 450453

NET Job No.: 97.15658

Sample Description: PS-04-36
MM EE/CA

Date Taken: 12/21/1997
Time Taken: 12:30
IEPA Cert. No. 100221

Date Received: 12/23/1997
Time Received: 13:25
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	6.6	M+	01/02/1998	0.50	jtt	84 443	7060 (1)
Cadmium, ICP	0.83	ug/g	12/29/1997	0.50	jtt	910 1625	6010B(9)
Chromium, ICP	12	ug/g	12/29/1997	2.0	jtt	910 1611	6010B(9)
Lead, ICP	100	ug/g	12/29/1997	4.0	jtt	910 1834	6010B(9)

M+ : Analyte quantified by MSA due to low spike recovery.



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ANALYTICAL REPORT

Mr. Mike DeRosa
ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191

01/06/1998

Sample No. : 450455

NET Job No.: 97.15658

Sample Description: FB-005
MM EE/CA

Date Taken: 12/21/1997
Time Taken: 12:30
IEPA Cert. No. 100221

Date Received: 12/23/1997
Time Received: 13:25
WDNR Cert. No. 999447130

Parameter	Results	Units	Date of Analysis	Method PQL	Analyst	Batch No. Prep/Run	Analytical Method
Arsenic, GFAA	<0.0050	mg/L	01/05/1998	0.0050	jtt	1108 935	7060 (1)
Cadmium, ICP	<0.010	mg/L	12/30/1997	0.010	jtt	1808 2978	6010B(9)
Chromium, ICP	<0.040	mg/L	12/30/1997	0.040	jtt	1808 2976	6010B(9)
Lead, ICP	<0.080	mg/L	12/30/1997	0.080	jtt	1808 3189	6010B(9)



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QUALITY CONTROL REPORT

CONTINUING CALIBRATION VERIFICATION

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

01/06/1998

NET Job Number: 97.15658

Analyte	Run Batch Number	CCV True Conc.	Conc. Found	Percent Recovery
Arsenic, GFAA	935	0.0250	0.0243	97.2
Arsenic, GFAA	935	0.0250	0.0259	103.6
Arsenic, GFAA	935	0.0250	0.0252	100.8
Cadmium, ICP	2978	1.00	1.01	101.0
Cadmium, ICP	2978	1.00	1.01	101.0
Cadmium, ICP	2978	1.00	1.03	103.0
Cadmium, ICP	2978	1.00	1.02	102.0
Cadmium, ICP	2978	1.00	1.03	103.0
Chromium, ICP	2976	2.00	2.02	101.0
Chromium, ICP	2976	2.00	2.03	101.5
Chromium, ICP	2976	2.00	2.06	103.0
Chromium, ICP	2976	2.00	2.03	101.5
Chromium, ICP	2976	2.00	2.03	101.5
Lead, ICP	3189	2.00	2.06	103.0
Lead, ICP	3189	2.00	2.03	101.5
Lead, ICP	3189	2.00	2.10	105.0
Lead, ICP	3189	2.00	2.07	103.5
Lead, ICP	3189	2.00	2.05	102.5
Arsenic, GFAA	443	0.0250	0.0252	100.8
Arsenic, GFAA	443	0.0250	0.0257	102.8
Arsenic, GFAA	443	0.0250	0.0256	102.4
Arsenic, GFAA	443	0.0250	0.0241	96.4
Cadmium, ICP	1625	1.00	1.02	102.0
Cadmium, ICP	1625	1.00	1.02	102.0
Cadmium, ICP	1625	1.00	0.999	99.9
Cadmium, ICP	1625	1.00	1.00	100.0
Cadmium, ICP	1625	1.00	1.01	101.0

CCV - Continuing Calibration Verification

00009



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QUALITY CONTROL REPORT

CONTINUING CALIBRATION BLANK ANALYSIS

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

01/06/1998

NET Job Number: 97.15658

Analyte	Run Batch Number	CCB Results	Units	Reporting Limit	Analytical Method
Arsenic, GFAA	935	<0.0050	mg/L	0.0050	7060 (1)
Arsenic, GFAA	935	<0.0050	mg/L	0.0050	7060 (1)
Cadmium, ICP	2978	<0.010	mg/L	0.010	6010B(9)
Cadmium, ICP	2978	<0.010	mg/L	0.010	6010B(9)
Cadmium, ICP	2978	<0.010	mg/L	0.010	6010B(9)
Cadmium, ICP	2978	<0.010	mg/L	0.010	6010B(9)
Cadmium, ICP	2978	<0.010	mg/L	0.010	6010B(9)
Chromium, ICP	2976	<0.040	mg/L	0.040	6010B(9)
Chromium, ICP	2976	<0.040	mg/L	0.040	6010B(9)
Chromium, ICP	2976	<0.040	mg/L	0.040	6010B(9)
Chromium, ICP	2976	<0.040	mg/L	0.040	6010B(9)
Chromium, ICP	2976	<0.040	mg/L	0.040	6010B(9)
Lead, ICP	3189	<0.080	mg/L	0.080	6010B(9)
Lead, ICP	3189	<0.080	mg/L	0.080	6010B(9)
Lead, ICP	3189	<0.080	mg/L	0.080	6010B(9)
Lead, ICP	3189	<0.080	mg/L	0.080	6010B(9)
Lead, ICP	3189	<0.080	mg/L	0.080	6010B(9)
Arsenic, GFAA	443	<0.50	ug/g	0.50	7060 (1)
Arsenic, GFAA	443	<0.50	ug/g	0.50	7060 (1)
Arsenic, GFAA	443	<0.50	ug/g	0.50	7060 (1)
Cadmium, ICP	1625	<0.50	ug/g	0.50	6010B(9)
Cadmium, ICP	1625	<0.50	ug/g	0.50	6010B(9)
Cadmium, ICP	1625	<0.50	ug/g	0.50	6010B(9)
Cadmium, ICP	1625	<0.50	ug/g	0.50	6010B(9)
Cadmium, ICP	1625	<0.50	ug/g	0.50	6010B(9)

CCB - Continuing Calibration Blank

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NATIONAL
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QUALITY CONTROL REPORT

BLANK ANALYSIS

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

01/06/1998

NET Job Number: 97.15658

Analyte	Prep Batch Number	Run Batch Number	Blank Analysis Results	Units	Reporting Limit	Analytical Method
Arsenic, GFAA	1108	935	<0.0050	mg/L	0.0050	7060 (1)
Cadmium, ICP	1808	2978	<0.010	mg/L	0.010	6010B(9)
Chromium, ICP	1808	2976	<0.040	mg/L	0.040	6010B(9)
Lead, ICP	1808	3189	<0.080	mg/L	0.080	6010B(9)
Arsenic, GFAA	84	443	<0.50	ug/g	0.50	7060 (1)
Cadmium, ICP	910	1625	<0.50	ug/g	0.50	6010B(9)
Chromium, ICP	910	1611	<2.0	ug/g	2.0	6010B(9)
Lead, ICP	910	1834	<4.0	ug/g	4.0	6010B(9)

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(800) 807-2877

QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

ENTACT
1360 Woodale Road
Suite A
Woodale, IL 60191
Mr. Mike DeRosa

01/06/1998

NET Job Number: 97.15658

Analyte	Prep	Run	Matrix	Sample	Spike	Units	Percent	MSD		Percent	MS/
	Batch	Batch	Spike					MSD	Spike		
	Number	Number	Result	Result	Amount		Recovery	Result	Amount	Recovery	RPD
Arsenic, GFAA	1108	935	0.0227	<0.0050	0.0200	mg/L	113.5	0.0237	0.0200	118.5	4.1
Cadmium, ICP	1808	2978	0.501	<0.010	0.500	mg/L	100.2	0.480	0.500	96.0	4.1
Chromium, ICP	1808	2976	1.29	0.229	1.00	mg/L	106.1	1.23	1.00	100.1	5.1
Lead, ICP	1808	3189	0.957	<0.080	1.00	mg/L	95.7	0.980	1.00	98.0	2.4
*Arsenic, GFAA	84	443	6.6	6.6	1.0	ug/g	0.0	7.5	1.0	90.0	20.0
Cadmium, ICP	910	1625	23	<0.50	25	ug/g	92.0	23	25	92.0	0.0
Chromium, ICP	910	1611	56	10	50	ug/g	92.0	54	50	88.0	4.4
Lead, ICP	910	1835	61	18	50.0	ug/g	86.0	60	50.0	84.0	2.4

* Sample analyzed by method of standard additions.

NOTE: Matrix Spike Samples may not be samples from this job.

Advisory Control Limits for MS/MSDs:

For Inorganic Parameters and GC Volatiles, the spike recovery should be 75 - 125% if the spike added value was greater than or equal to one fourth of the sample result value. If not, the control limits are not established. The RPD for the MS/MSD pair should be less than 20.

MS = Matrix Spike

MSD = Matrix Spike Duplicate

RPD = Relative Percent Difference

RPD calculations are performed on the Percent Recovery calculated from the observed Matrix spike and Matrix Spike Duplicate results.

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Appendix B

Complete Analytical Data/Raw Data

(Under Seperate Cover)

CONFIDENTIAL INFORMATION OF ENTACT

Entact uses proprietary technology in additive and treatment processing to achieve its fixation and permeability results. Patents are both issued and pending, including U.S. Patent # 5,588,947, # 5,591,116, and # 5,667,696.

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